ISASC

EQUILIBRIUM®

QUARTERLY MAGAZINE OF THE INTERNATIONAL SOCIETY OF ANTIQUE SCALE COLLECTORS

1995—ISSUE NO. 1 PAGES 1861-1888

PAGE 1862

Cover Picture

This elliptical spring balance has the serial no. 6419. Another exists with the no. 12,462. See the item on Siebe and Marriott on pages 1882 to 1888.

Notes & Queries

N & Q 127	from D F Crawforth–Hitchins

Can anybody tell me the "First possible date" for using aniline dye? It was used as a magenta/mauve/pink/purple dye on velvets in scale boxes after 1850.

N & Q 127	reply from S D Beare

Regarding purple dye, William Henry Perkin accidentally discovered the aniline dye mauve at age of 18 in 1856, while trying to synthesise quinine. In May, 1857, he and his father acquired a manufacturing site at Greenford Green near Harrow (west of London) and in early December, Perkin & Sons shipped its first consignment of dye to Thomas Keith, a major silk dyer in the east of London (where the silk was woven.) Things moved slowly until the end of 1858, when the aniline mauve was adopted by French dyers in the Mulhouse region, and the winter of 1858/9 saw a flurry of activity by English dyers. So, even though this dye was discovered in 1856, it was not broadly used until around 1858 or 1859, which I believe is close to the date you have used. My reference for this is an article by Anthony S Travis on Perkin in the *Textile Chemist and Colourist,* pp. 13–18, vol. 20, no. 8, 1988.

INTERNATIONAL SOCIETY OF ANTIQUE SCALE COLLECTORS

Founded September, 1976

176 West Adams St.* Suite 1706 * Chicago, IL 60603 * USA * Tel. 312/263-7500

EQUILIBRIUM is published quarterly in January, April, July and October.

Editor--Diana Crawforth-Hitchins, 15 Hawthorn Ave., Headington, Oxford OX3 9JQ, England.

Associate Editor--Ruth Hendricks Willard, P.O. Box 27565, San Francisco, CA 94127, USA.

ISSN-0893-2883

Mancurs

From T STEIN

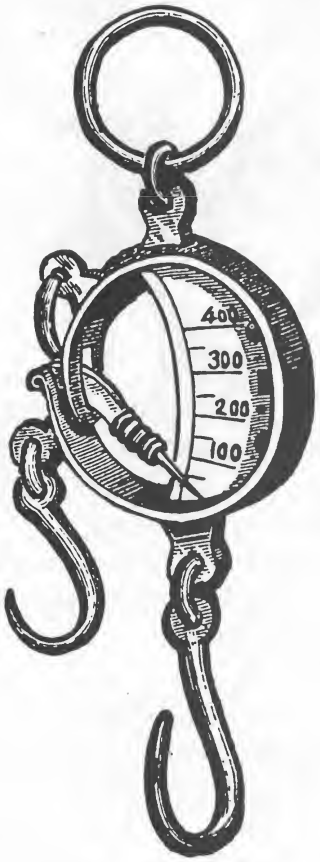
Comments by D Crawforth–Hitchins

Ted Stein lent ISASC the catalogue of Norvell–Shapleigh Hardware Co. of 1903. Under Ice Balances was *no. 1155, German Crab, double hook, capacity 5 x 300 lb..$12.00 per dozen.* Fascinating. The illustration (Fig. 1,) shows a conventional two hook mancur spring balance, but with this unusual name, German Crab, another to add to M Stevenson's list on EQM page 431.

Names by which the Mancur Balance has been known:

C–Biegefeder
Demi–lune (quarter moon)
German Crab
Gypsy scale
Hide scale
Jaeger waage (hunters' scale)
Jagd–waage
Kitchen scale
Mancur balance
Mondwaage (moon scale)
Ovale veerbalans
Peson à ressort
Rationswaage (rations' scale)
Ressort en lame (flat strip)
Romaine à cadran
Stalen Zakunsters
Stilliard

It has proved to be impossible to gain a clear picture of how these scales were dispersed in the US, or to ascertain their use in the US. They are said to have been called Hide scales in the US, and they would have weighed hides satisfactorily, but where is the documentary evidence? They have survived in such numbers, that they must have filled a need, but what for? They range in capacity between 30 lbs, (14 kilos) and 880 lbs, (400 kilos,) an astonishing capacity for such a compact object, The range of capacities suggest that they were general purpose scales, and easy to carry about, say, round a ranch or on a cart.



1155—German Crab,

Fig. 1. Norvell–Shapleigh Hardware Co. 1903. German Crab. Double hook, capacity 5 x 300 lbs. (5 x 136 kilos.) Per dozen $12. Note the cast pointer.

As the basic principles were admirably described by Stevenson, EQM, pages 431 to 438, there is no need to explain them further, but it would be worth while to make a fresh list of the known makers of mancurs. See pages 1874 to 1876.

Mancurs come under the sub–division of "flexure spring" spring balances. The French and the Germans developed some variations on the flexure spring theme, with the V spring as the simplest version. The V spring was illustrated in Diderot's encyclopaedia, (Fig. 2) written between 1752 and 1763, the date it was published. The design never changed significantly, and was obviously very practical.

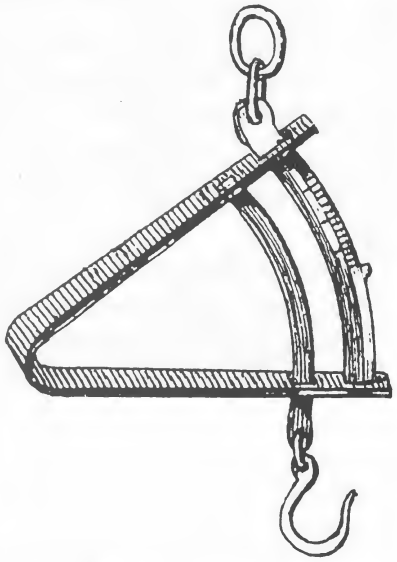


Fig. 2. From Diderot's encyclo–pedia of about 1755. The spring is compressed by the load pulling the V shut.

The ordinary mancur with one hook (called by the French the

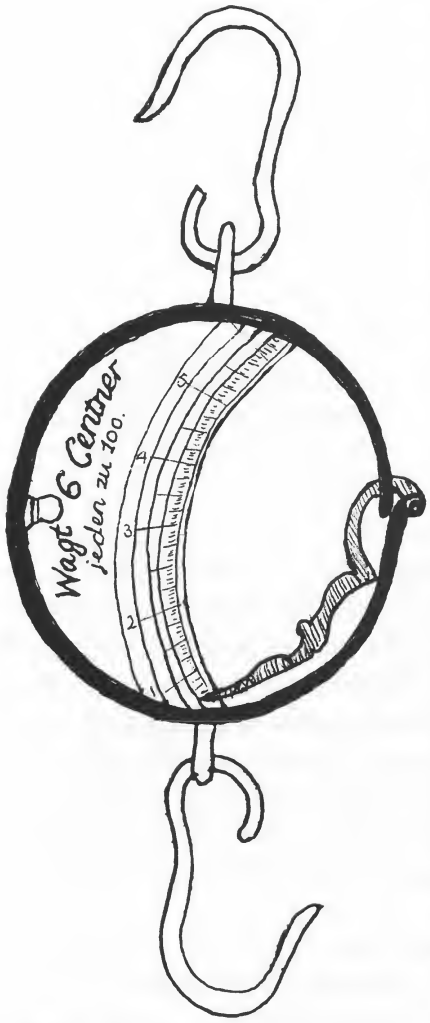


Fig. 3. J G Sessler's hunting scale, made before 1763. The mancur was stored in a wooden box, covered inside and out with red leather. The hooks were stored under the mancur, under a leather flap.
Schlossmuseum, Aschaffenburg.

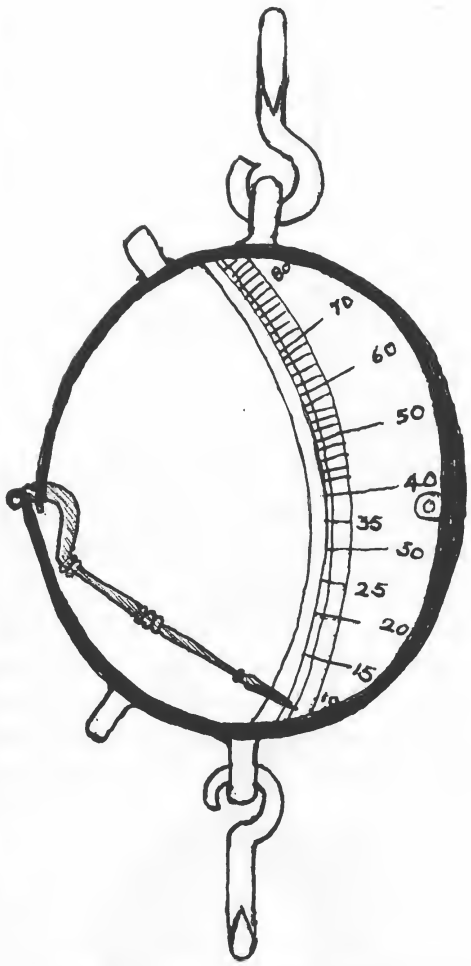


Fig. 4. "Wiedeman's stilliard", in George III's collection at the Science Museum, London. Originally in the collection of the Duke of Cumberland, who died in 1765. Graduated 10 to 90 (lbs.) on the light side and 50 to 322 (lbs.) on the heavy side, with each stone marked between 50 and 322. This suggests the maker knew that the user would be an Englishman. 12" overall. Stored in a wooden case, covered with brown leather. SM no. 1927-1150.

"demi-lune" or crescent-moon, and abbreviated to DLO in the table on pages 1874 to 1876,) was perhaps the first mancur to be developed, going by the evidence of J G Sessler's mancur that he made for the Elector Johann Freidrich Karl von Ostein, who died in 1763. See the EQM cover picture on page 429 and Fig. 3 above. Sessler made the leather case very compact by having removable hooks (one hook was used as a handle,) which could be stored under the mancur in a fitted block. The other surviving mancur made by Sessler also had only one set of suspension points, again with two removable hooks. (See Le Système Métrique, page 810.)

The two hook mancur had one set of graduations on one side of the demi-lune for heavier loads, (to be used with the handle at the top of the spring and the load hook at the bottom of the spring,) and another set of graduations on the other side of the demi-lune for lighter loads, (to be used with the handle at the side and the load hook below the handle, but not at the bottom of the spring.) The example most like the Sessler's is the example held at the Science Museum in London in the King George III's collection. (Fig. 4.) It is labelled in manuscript on its box "Wiedeman's Stilliard". It has two removable hooks which can be used in either of the positions mentioned above. (As far as can be ascertained, the hooks on all later examples were permanently attached to the spring.) It also has a flimsy pointer like the Sessler's. As it was made within a year or two of the Sessler's, it is not surprising that it is so similar. (Can any reader tell ISASC members who Wiedeman was?)

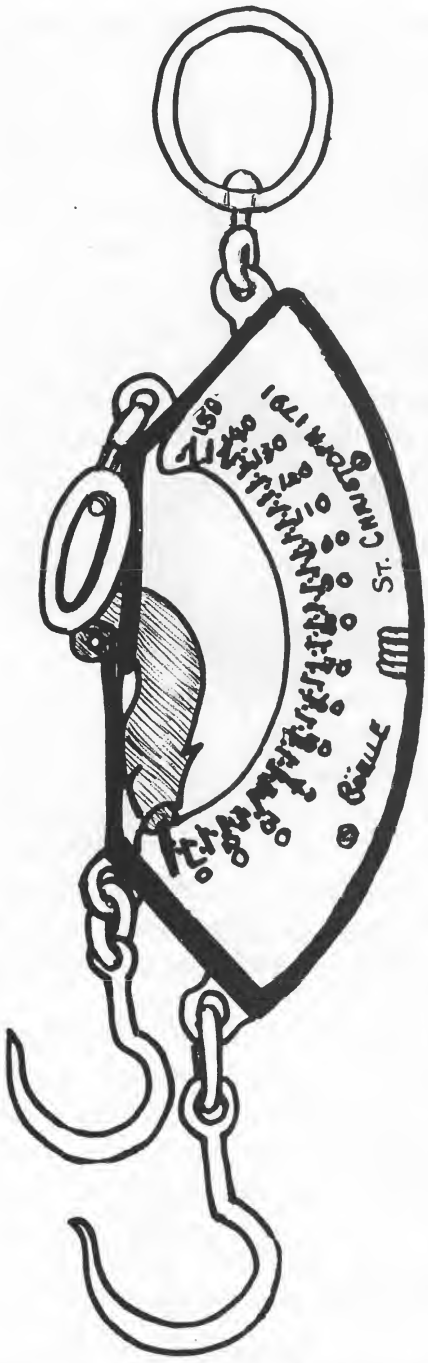


Fig. 5. A "demi-lune hexagonal", or mancur with angled ends, made by Böelle à St. Christoph, in 1791. One made by M Böelle in 1787, was shown in EQM, page 432. Note that all mancurs, whether round or hexagonal, have a very small bracket fastening the brass demi-lune to the iron spring. This is an essential feature, because the spring is opened out by the load, leaving the demi-lune held only by the bracket. If the bracket was any bigger, there would be strain between the two parts. The pointer was made of flat iron, with an extra layer attached to the point, to provide a second point on the other side of the demi-lune, (ie, the pointer is bifurcated.) The handles had high quality swivelling attachments.

Next in complexity was the demi-lune with a half hexagonal side, (Fig. 5,) called the demi-lune hexagonal by the French and abbreviated to DLH in the table on pages 1874 and 1876. This type came with one hook or two, as with the ordinary mancur, DLO. The earliest dated DLH seen by the author was dated 1770. This suggests that the ordinary mancur and the demi-lune hexagonal were developed at very much the same time.

Hanin developed a C spring with a rack and pinion joining the two ends of the spring to the pointer, with a circular face mounted on the front, so that the C spring was hidden from view. This was called the "peson à cadre circulaire" by the French, and is abbreviated to C in the table. See Figs. 7, 8 & 9. The Gazette de France of 5th July, 1765 included this article, [translated by the author.] *"The master Hanin, firm in Saint-Romain, in the province of Caux, has presented to the Royal Academy of Sciences a self-indicating balance of his own invention, by which he has used a pointer that indicates the weight of loads with which it is loaded. The Officials nominated by the Academy to examine this instrument judge it to be very ingenious, executed with precision and suitable to be used because of these details which determine the weight of merchandise to be purchased or which are going to be sold."* The Conservatoire National des Arts

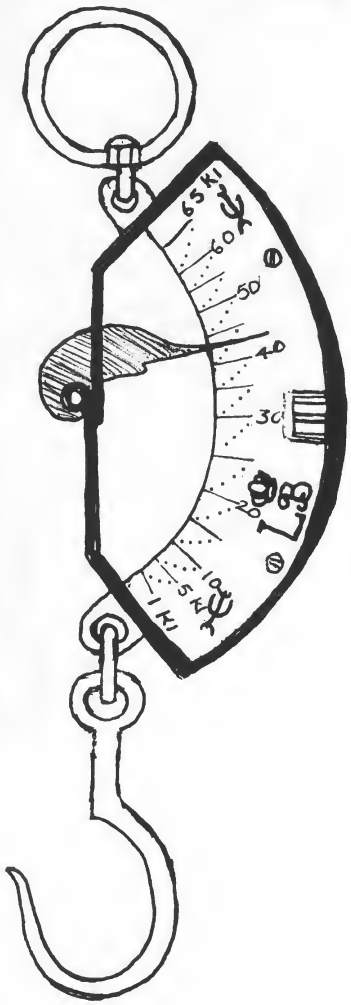


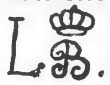
Fig. 6. Demi-lune hexagonal with one set of graduations, made by Le Boucher, and marked with his  and his little symbol,  It was graduated in kilos, 1-65. 12" (300 mm.) overall.

Fig. 8. Close-up of the centre of the scale on the left.→

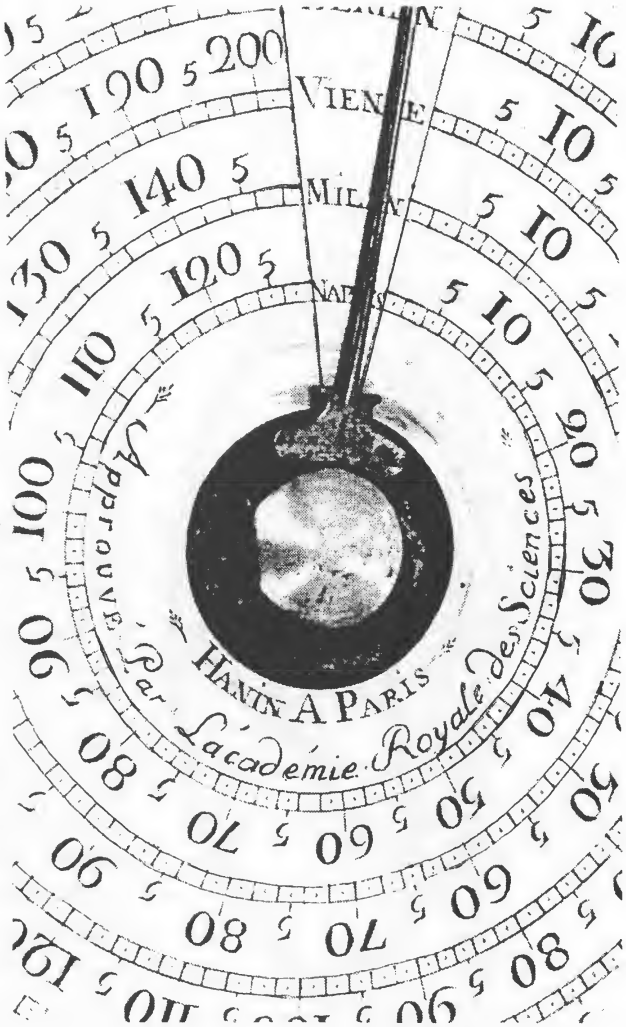
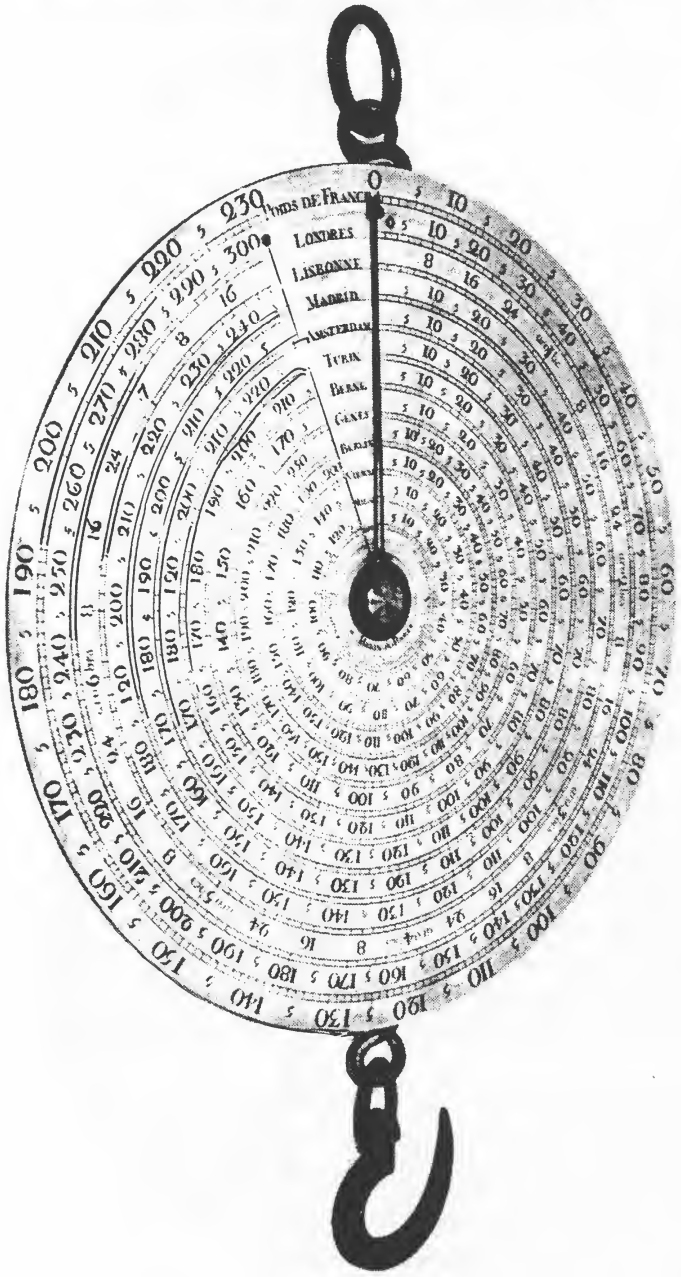


Fig. 7. Cadran annulaire or dial face spring balance, *"Hanin à Paris. Approuvé par l'Académie Royale des Sciences."* Approved 14th March, 1788. ↓



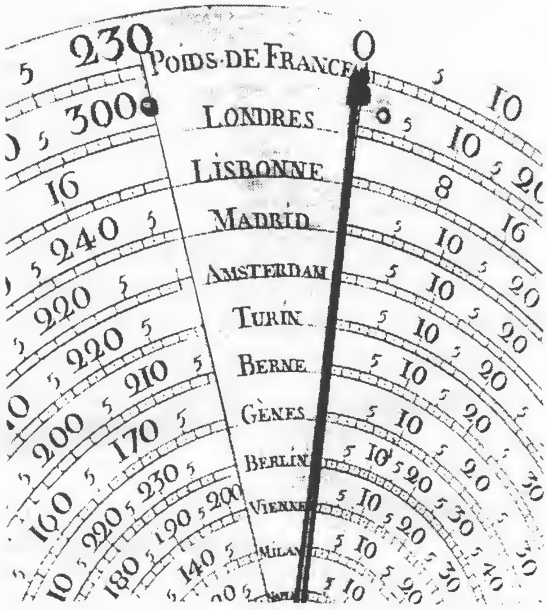


Fig. 9. Close-up of the dial of the scale above left. Note that the French livre was much heavier than the English Troy pound, and had a ratio of 100:131.6.→

et Métiers in Paris has one by Hanin Fils mounted on a pillar, with a platform at the bottom of the pillar on which the user balanced to find his weight. Having stepped on this platform and promptly fallen off, the author has more respect for Hanin Fils's skill as a maker of spring balances than for his skill as a designer of Y and V levers to go under the platform! Was this the design for which Hanin (père et fils) took out a patent in 1792? See Le Système métrique, page 200. (The patent application had no details with it.)

Hanin fils, (Guillaume Emmanuel Hanin,) made the same circular spring balances as his father, but cut away the centre of the dial so that the rack and pinion was visible to the user from the front. He was making this version before he left St. Romain in 1785/6 to work in the Paris workshop. See the photograph in Le Système métrique, page 727, which shows the dial cut away to a fine ring, leaving less of the brass dial than other, later makers. See a later anonymous example in Figs. 11 & 12. (Hanin fils was described as a "balancier mécanicien" when he patented a beautiful pair of compasses in 1794. The special feature was that one leg was extended upwards, forming a pointer passing over the face of a graduated arc 5" (125 mm) wide, marked out with pied (feet) of France on the outer arc, pied d'Angleterre on the next arc in, then of the Rhin, Castille, Vienne and Bruxelles using the same principle as fig. 7, but using a quarter of the circle. See Le Système métrique, page 521–532.)

Chemin à Paris made C springs attached by rack and pinion to the pointer, clearly engraved *"Brevet d'invention Hanin. Chemin à Paris,"* and calibrated in 2 units, livres and kilos. Presumably this was made after Hanin fils made his 2 unit version graduated in kilos and poids de marc, exhibited in 1806.

One example is known of a C spring with straight ends pulling the pointer round the arc without a rack and pinion. It was made by Ulr. Luginbühl, and had his trade–mark of a minute crescent moon with a U on the cheek. The pointer was made in two parts, a flat curved part, and a triangular sectioned bifurcated part. Every number was engraved from 1 to 60. The units were not identified. It was numbered 2370 on the rear and it was 12" (300 mm.) high overall. See Fig. 10. He also made a standard demi–lune hexagon DLH, with one set of graduations, from 5 to 300, and a cast pointer, 16" (400 mm.) high overall, with his crescent moon trade–mark and his signature. The number 2626 was stamped on the rear.

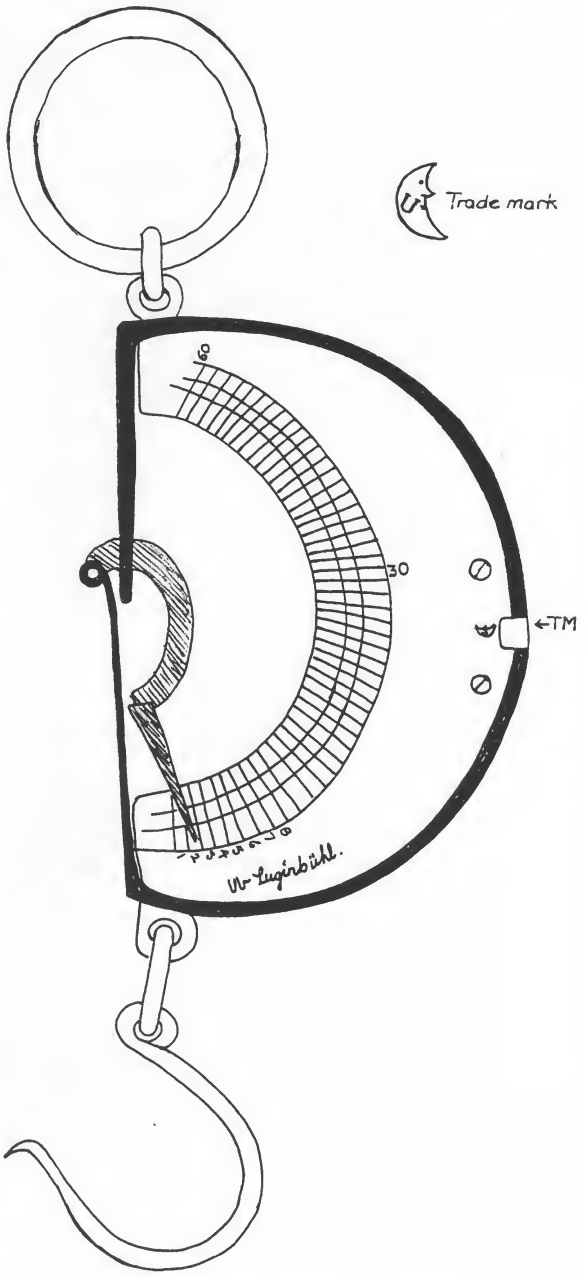


Fig. 10. Ulr. Luginbühl's special variation.

Luginbühl's cast pointer on DLH.

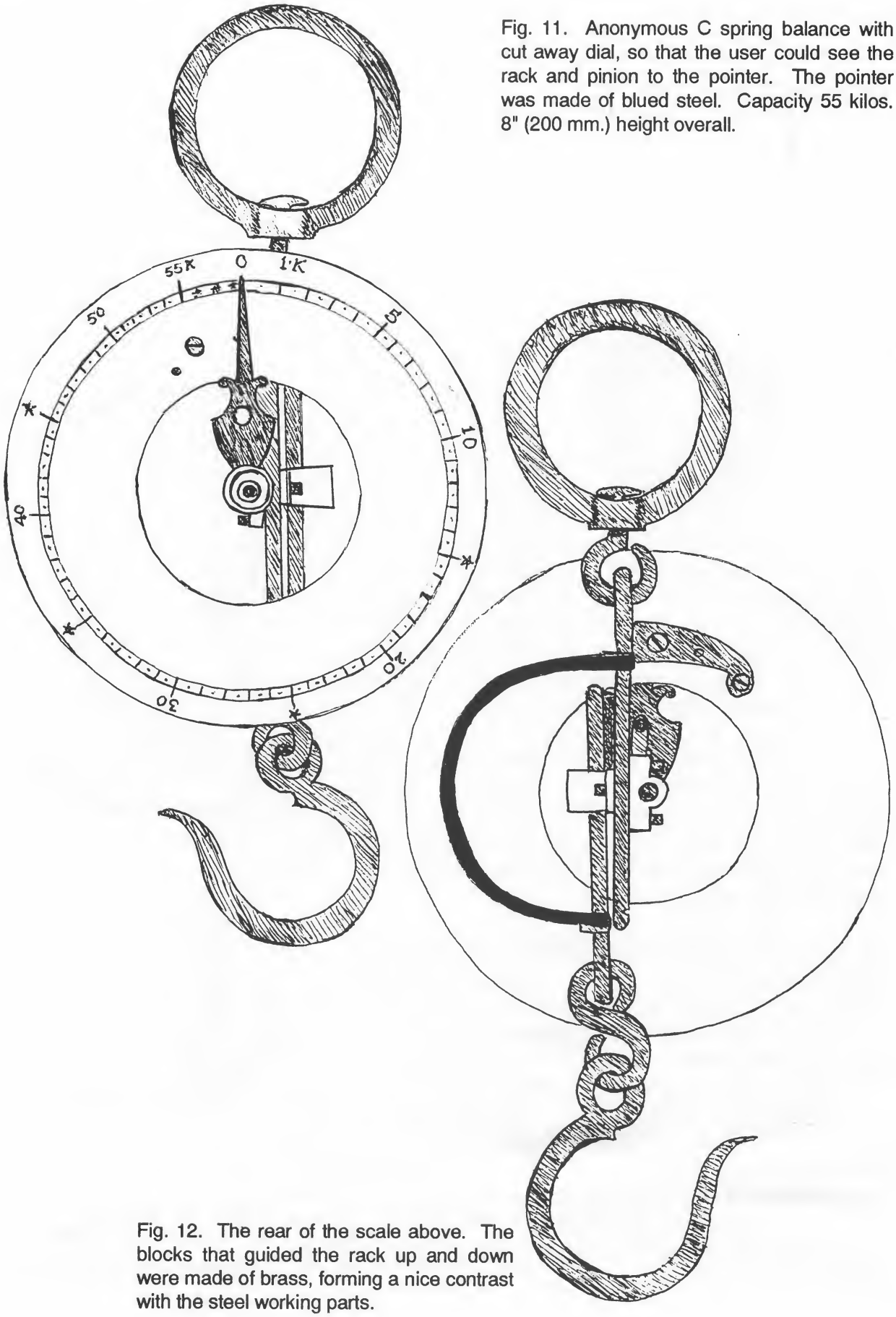


Fig. 11. Anonymous C spring balance with cut away dial, so that the user could see the rack and pinion to the pointer. The pointer was made of blued steel. Capacity 55 kilos. 8" (200 mm.) height overall.

Fig. 12. The rear of the scale above. The blocks that guided the rack up and down were made of brass, forming a nice contrast with the steel working parts.

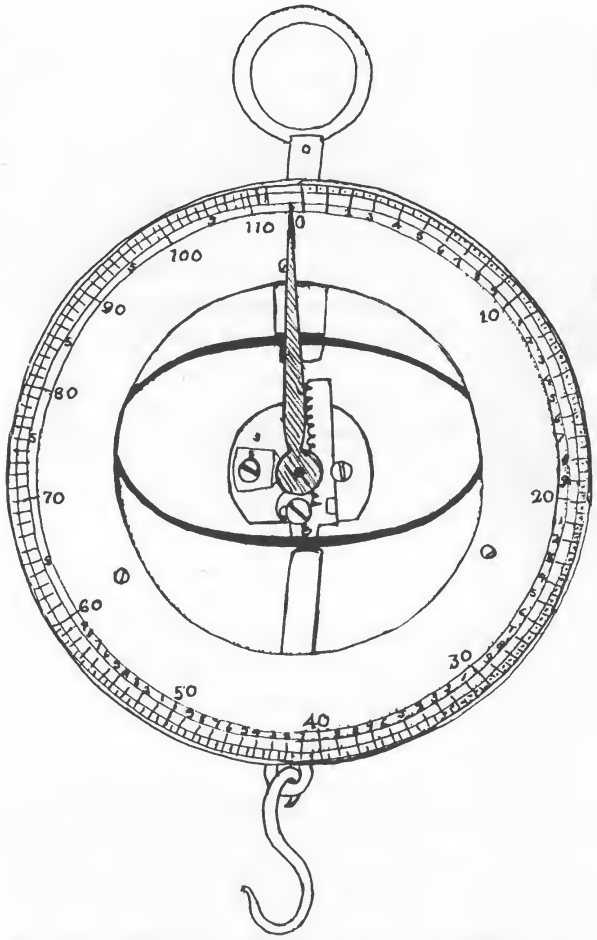


Fig. 13. Elliptical spring balance, 13" (330 mm.) height overall. Science Museum no. 1927-1456.

Three examples are known of a C curved over the top and half way across the horizontal plane, (figs. 14, 15 & 16.) Because the engraving on the brass faces was rather crude, it is tempting to think that this design was an early one. A simply engraved one is held by the Conservatoire National des Arts et Métiers in Paris, and a fancy one by the Musée Le Secq des Tournelles in Rouen, (fig. 14.) As two were found in France, that hints at a French maker. The third simple one is held by the History of Science Museum, Oxford, (figs. 15 & 16.) The spring is fixed to the brass face at the left-hand side (when viewed from the back) and rocks a plate near the centre. When the load pulls down, the plate twists round its centre, and the pointer attached to the plate is pulled round the dial.

The George III collection in the Science Museum, London, has a cut away dial, showing an elliptical spring instead of a C spring. See Fig. 13. This type is not recorded by any of the authors used to compile this work, but Morton and Wess, in "Public and Private Science" report *"A similar spring balance is in the Avery Museum, the catalogue of which credits Edme Regnier with its invention in 1790."* If Regnier did invent it, he did not patent it. Can any of our French members tell us more about Regnier? Morton and Wess report that the balance is graduated from 0 to 112 (pounds), and that the rear is scratched *"1 20 96."* Is this the date that it was made? (Elliptical springs are discussed further in the article on Siebe and Marriott on pages 1882 to 1888.)

Fig. 14. The pierced pointer is reminiscent of a pair of scissors.

Fig. 15. Brass face. Screws round the 70 show where the C spring is attached. The offset screw on the base of the pointer shows where the plate at the back is attached. The numbers are not English. The 3 zig-zags without curves. The 5 is does not curl round in the English fashion, but has a straight slope. History of Science Museum, Oxford.

Fig. 16. The back of the scale above. This one is in good condition, but the fancy one from Rouen has been overloaded and the spring is broken.

Fig. 17. Diagram of the previous scale, showing the spring mechanism.

There were a few "Specials" of a curved version of the demi-hexagon design, called SPEC in the table. One example was made by P Herbertz. See Fig. 18. It has been impossible to trace P Herbertz amongst the family in Solingen, unless he was one of the J P Herbertz.

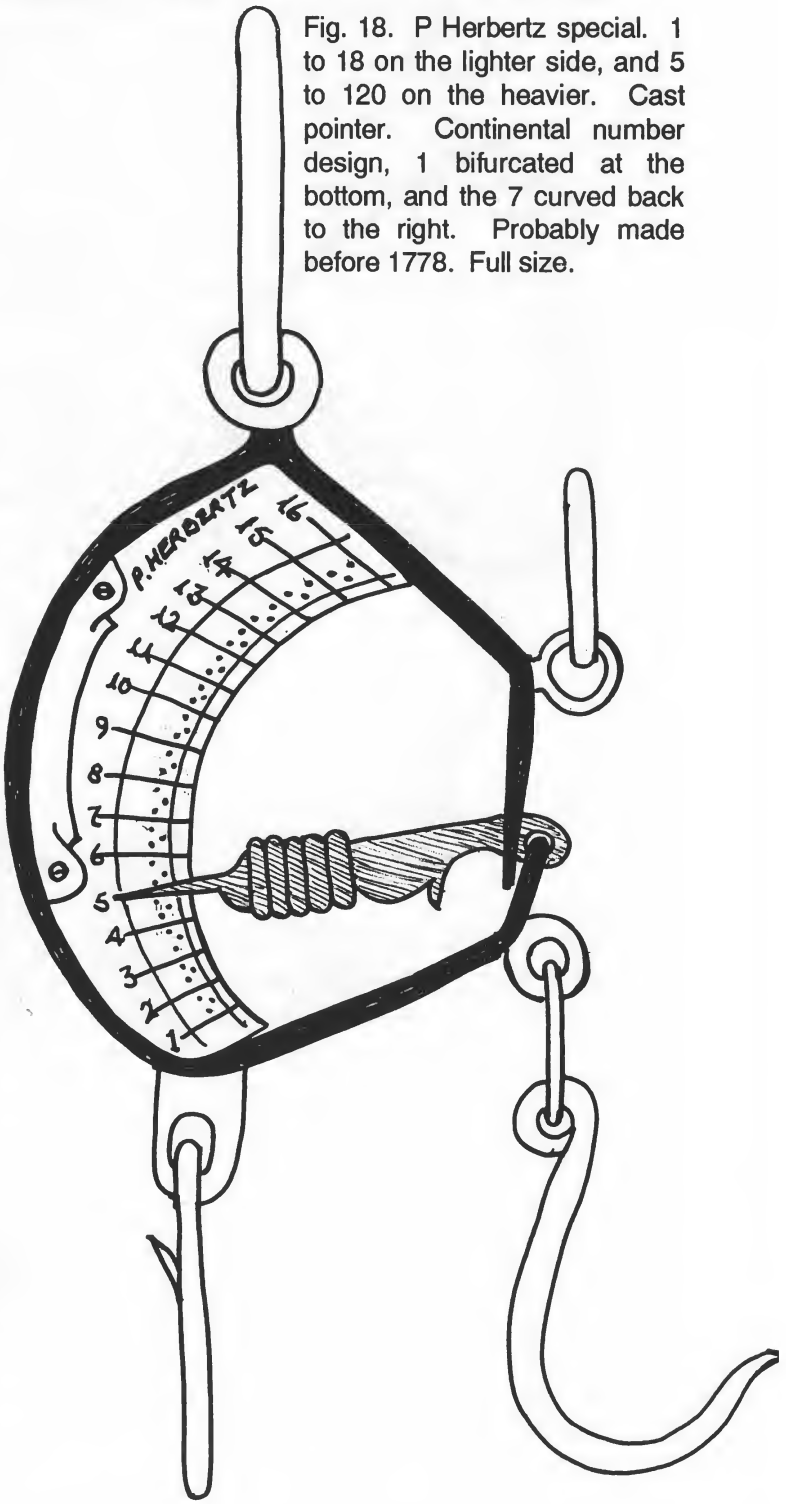


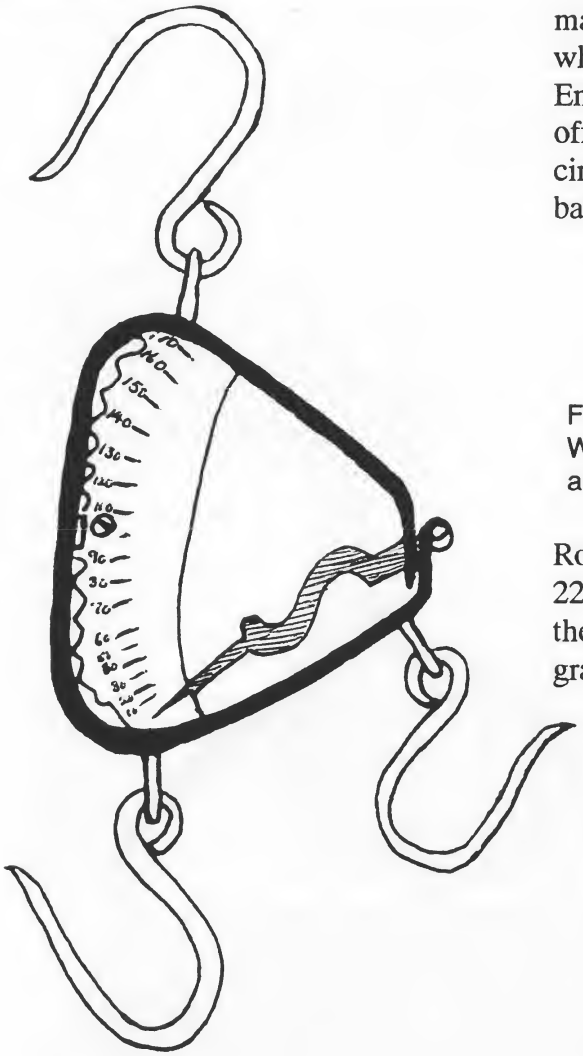
Fig. 18. P Herbertz special. 1 to 18 on the lighter side, and 5 to 120 on the heavier. Cast pointer. Continental number design, 1 bifurcated at the bottom, and the 7 curved back to the right. Probably made before 1778. Full size.

Johann Philipp Herbertz, Senior was born in 1699 and died 26. 2. 1770, and Johann Philipp Herbertz, Junior was baptised 14. 4. 1736 and died 30. 9. 1778. Either man could have made it, as the family is known to have omitted the first name sometimes. Johann Wilhelm Herbertz signed one of his coin scales "Wilem Herberts", missing out the Johann entirely. See Mass & Gewicht, page 102.

Another special was an anonymous one shown in Le Système métrique on page 727. See Fig. 19. The spring was a rather curved version of a DLH, but unusually, there was only one suspension point for the two load hooks. No details were given about maker, units, date, etc. but the photograph showed that the units were more closely spaced at the lower end than at the upper end. Was this a product of the irregularly bent spring?

A pretty example was shown in Mass und Gewicht, page 650. See fig. 21. It was graduated 0–21, and 20–160 lb. It was 13" (340 mm.) high overall, and had a pointer with a series of lobes engraved down it and a nicely cast series of barrels lower down.

Fig. 19. A special with one suspension point but two load hooks.



Some companies offered mancurs for sale amongst their "bought-in" items, as if specialised spring-making companies made mancurs, and sold them wholesale to ordinary scale companies. S van Embden of Nieuwendijk 134-138, Amsterdam, offered them on the same page as their RAPID circular spring balance and three Salter spring balances. See Meten & Wegen, page 758.

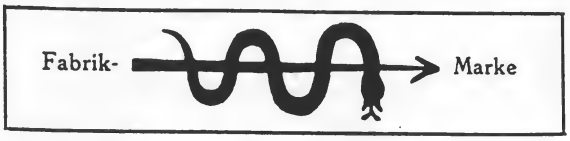


Fig. 20. Robert Krups' trademark. He had his factory in Wald, Rheinland, and he had retail outlets in London and Vienna in 1905.

Robert Krups was still making mancurs in 1905. Fig. 22 & 23. One "rationswaage" had one load hook, but the pointer was bifurcated and the demi-lune was graduated on both sides, on one side in kilos, and on the other in lbs., 8½" (210 mm.) high overall, and available in various capacities up to 200 kilos. One had two load hooks, and was graduated in various capacities up to a maximum of 0-40 and 30-300 kilos, 11½" (280 mm.) high overall. One of the same size but cheaper quality had one set of graduations on each side of the demi-lune but had numbers each side of the marks, in kilos nearer the pointer and in lbs. on the outer curve. They used a conversion rate of 1 kilo = 2 lbs!! (It should be 1 kilo = 2.2 lbs, approximately.) They offered a cheap, second quality one at half the price, but without their own trademark on it. None had the swivelling suspension ring that was such a useful feature of the early examples.

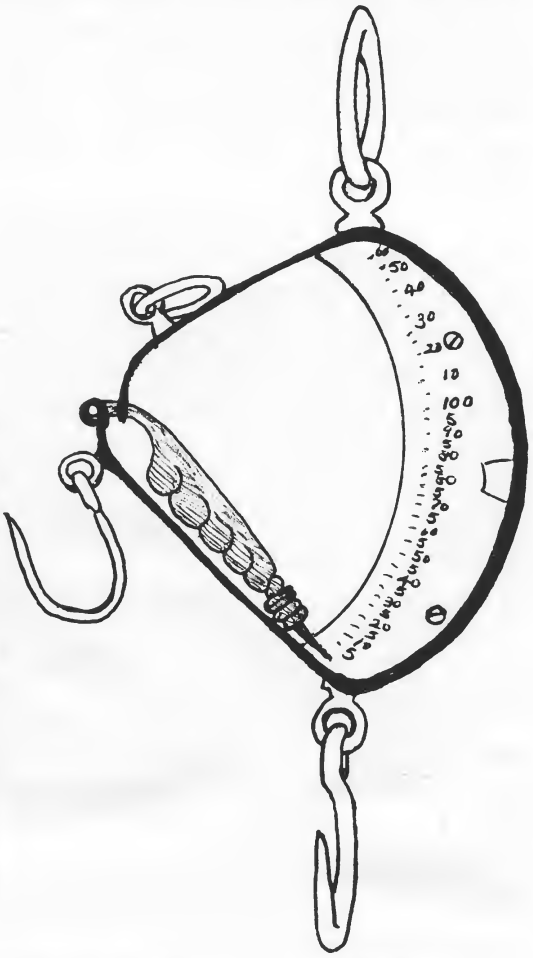


Fig. 21. A pretty pointer on a special.

Fig. 22. Robert Krups' catalogue, 1905.

L Paupier offered mancurs as tension testers for the Postes et Télégraphes in 1886. Mancurs were still offered in the catalogue of Testut in 1978, as *"Dynamomètre pour vérifier la tension des fils."* (dynamometer to verify the tension of wire.)

There were many warnings between 1801 and 1949 to French W & M inspectors to be cautious about stamping flat spring balances for trade use, on the grounds that they were frequently badly made, inaccurate and quick to deteriorate. (Quoted in full by Aimé Pommier in Le Système métrique, pages 142 and 143.) Only one was stamped for trade use that is recorded in the literature, one by Letermelier (that passed through Sotheby's Auction House in 1984.)

Mancurs were imported into the UK, being in the Crowden & Garrod catalogue of 1895, in the kitchen equipment section. They turn up in antique shops in the UK regularly, but, as with the USA, there is so little documentary evidence to explain their presence.

The mancurs designed by Geo. Salter & Co. (fig. 24,) had a round section spring, so that technically they were not flexure spring balances, but they are included in this section because they are obviously derived from the mancur. Salter's provided only one handle, but two load positions, so that the lighter loads were shown on one side of the demi-lune and the greater loads on the other side, as with ordinary mancurs. The design was said by Salter's to be a registered design, but

Fig. 23. Robert Krups' catalogue, 1905. On the left, the demi-lune is graduated in kilos and pounds. Note the shape of the hooks and the twisted pointer on the cheaper one on the right. It was half the price and bore no trademark.

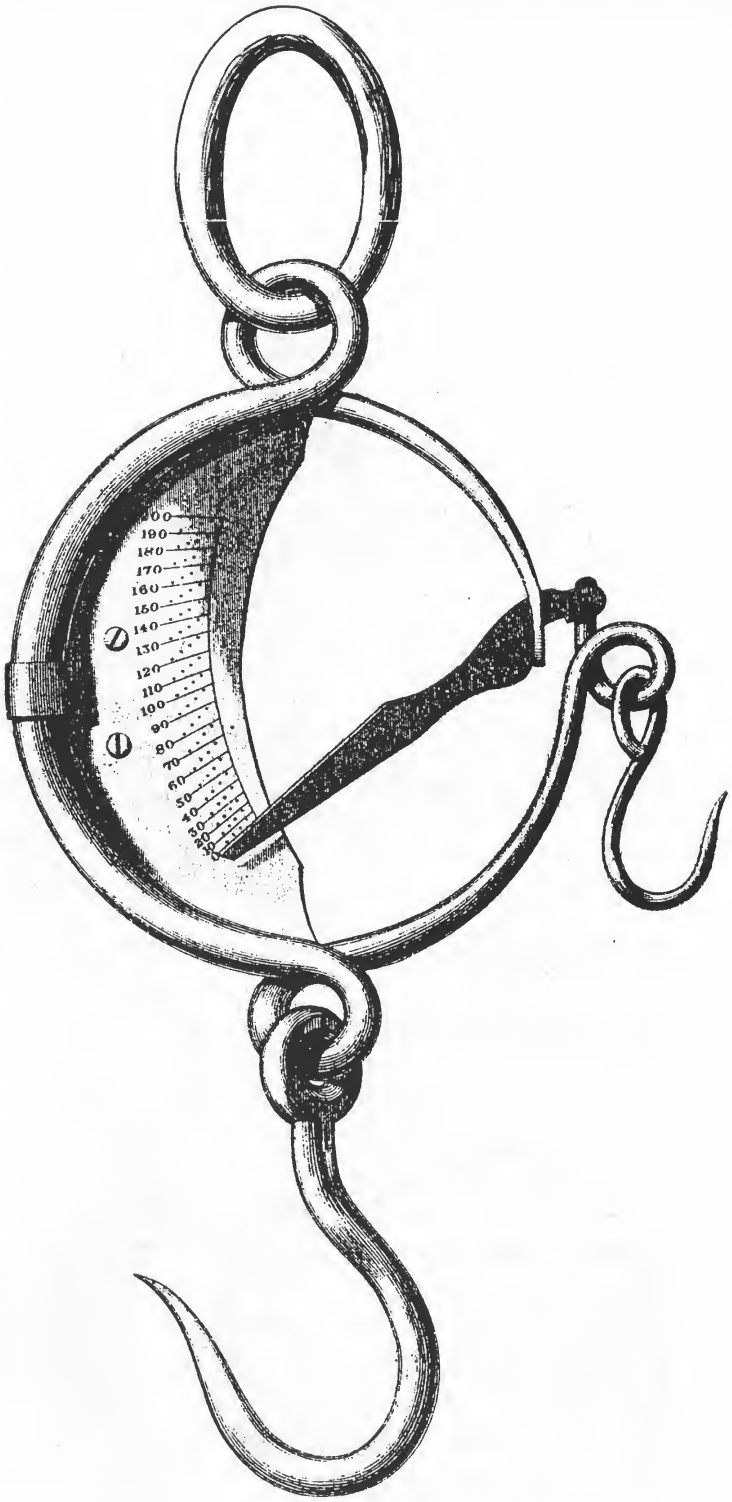


Fig. 24. Geo. Salter & Co. catalogue, 1893. "Mancur's Balance. (REGISTERED)." Four sizes available, the largest capacity 500 lbs. Note the continuous spring incorporating fixing points.

the design registration books of about 1880 have not been investigated, and our evidence comes from catalogues only, and from the objects themselves. Due to a shortage of catalogues, we can only say that Salter's invented them before 1888, but they were not in the 1877 catalogue, so presumably they were invented after 1877. Unusually for Salter's, there was no maker's mark put on the mancur, This is so odd for Salter's that it would be interesting to read the design registration book to see whether it was Salter's themselves who registered it or another manufacturer.

The mancurs most commonly seen in the US were made by Henry Boker, H Boker & Co. and Hilger and Sons. They have "Not for Trade Use" stamped onto them sometimes, so were obviously made specifically for export to the US. All examples look as if they were made in the later part of the 19th century, being machine–made and crisply finished. So, to go back to the beginning, who distributed them?

Fig. 25. Initials seen on a a rugged 14" mancur DLO. Is it DB or BD?

Names seen on Mancur Balances

	Name & Town	Country	Types made
	B (P Kalthoff)		DLO
	BD or DB		DLO
	Besnard		DLO
	Blombach C		DLO
1	Böelle à St Christoph	F	DLH
2	Böelle M	F	DLH
	Böelle et Breard	F	DLO
	Boe–Paupier à Paris	F	DLO

	Name & Town	Country	Types made
	Boker Henry	G	DLO
	Boker H & Co.	G	DLO
	Boucher J B		DLO
	Bureau des Ecorces (Fleury)	F	C
	C G		V
	C L B		DLO
	C M P		DLO

3	Chemin à Paris	F	C
	D B or B D		DLO
	D M		DLO
	D P		C
	Delalande		C
	Dubois Jacques		DLO
	Dumaine		DLO
	Dumaine P		DLO
	Dupont J au Fresne	F	DLH
	E H		V
	E L S		DLO
	F D		C
	F D P		DLO
	F F (Fleury Frères)	F	DLO
	F H		DLO V
4	Fleuri	F	C
	Fleuri à Pont Degrene	F	C
5	Fleuri G	F	C
	Fleuri M	F	C
	Fleury	F	C
	Fleury Frères	F	DLO DLH
	Grund P		C
	H & M		DLO
	H S		V
	Hamon F	F	V
	Hamon H	F	V
	Hamon I?	F	V
	Hamon P ainé	F	DLO
	Hamon Paul	F	V
	Hamon Pierre	F	V
6	Hanin	F	C DLO
	Hanin (le père)	F	C
	Hanin à Paris	F	C
7	Hanin à St Romain	F	C
	Hanin ainé	F	C
	Hanin fils	F	C
	Hanin fils à Paris	F	C
	Hanin fils à St Romain	F	C
	Herbertz P		SPE
	Hilger & Sons		DLO
	I crowned (Cheville père)	F	V
	I G. V P		DLO
	I L	F	DLO V
	I L T M		DLO
	Imhoff & Lang		DLO
	J B crowned	F	C
	J B G		V
	J M R		DLH
	Jarres R		DLO

	Jung C	G	DLO
	K & M		DLO
8	Kalthoff P		DLO
	Klein I		?
	Kleuser W		DLO
9	Krups Robert, Wald,	G	DLO
	L B (Leboucher)	F	DLH V
	L B & flower		V
10	Labiche à Sourdeval	F	DLH
	Lansen		DLO
	Leboucher & crescent	F	DLH
	Leboucher Eugene	F	DLO
	Leboucher Jnr	F	DLO
	Leboucher Manuel	F	C DLO
	Lebreton Eugene	F	C
	Lebreton Fils ainé à Sourdeval	F	C
11	Le Termelier	F	DLH C
	Letermelier (Termelier)	F	DLO
	Le Termelier Andrè	F	DLO
	Le Termelier A G T E	F	V
	Lemercier	F	C
	Lisicaux		V
	Lockhaus & Gunter, Remscheid,	G	DLO
	Luginbühl Ulr.		SPE DLH
12	M B (M Böelle?)		DLO
	M F G		DLO
	M F		DLO
	M F I		C
	MG C		C
	M S G		DLO
	Mari I crowned	F	DLH
	Miquelard à Avranches	F	C DLO
	O (?) L B		V
	P F		V
	P Q R		DLO
	Querue		DLO
13	R C		DLO
14	R S (Régnier à Semur)	F	DLO
	R V		C
	Reform (R Krups)	G	DLO
	Régnier à Paris	F	V
	Renaut N		DLH
	Riviere		C
15	Salter George & Co. West Bromwich,	U K	DLO
	Samon		V
	 (Schmidt Peter Ludwig)	G	DLO

	Seers		DLO
16	Sessler J G	G	DLO
17	Termelier Andrè	F	V DLO
	Tesche C W		DLO
	Tesche W W		DLO
	Testut Charles et Fils à Paris,	F	DLO

	Tribo		DLO
	Venot		C
	Wegermuff A		DLO
	 (fish)		DLO
	 (flower)		DLO

Can any readers add more names to this list? Please write to the editor with additions.

For non–French speakers, *à* and *au* mean *from* or *of*.
et means *and.*
Ainé means *the elder*.
Fils means *son* or *wire*.
Le père means *the father.*

1. . Böelle à St Christoph dated a mancur 1791.
2. . M Böelle dated DLHs between 1780 and 1794.
3. . Chemin made dials without the cut–away centre, with a semi–circular C spring at the back, joined by rack and pinion to the pointer.
4. . Fleuri dated scales between 1817 and 1822.
5. . G Fleuri dated scales between 1817 and 1818.
6. . Hanin presented to the Académie royale des Sciences, a peson à ressort (self–indicating balance) of his invention. This was a C spring balance with dial and a rack and pinion to the pointer. This model was called "Romaine à cadran" by the Administration.
7. . Hanin à St. Romain made dials without the centre cut away, with a semi–circular C spring at the back joined to the pointer by a rack and pinion.
8. .Peter Kalthoff of Remscheider Str, Remscheid–Lüttringhausen, also made letter scales.
9. .Robert Krups had DLOs in his catalogue of 1905.
10..Labiche à Sourdeval 1822 on DLH.
11..Letermelier made a cadran circulaire which was stamped for trade use with a fleur–de–lys.
12..M B 1770 on DLO. (M Böelle, probably.) Is this the earliest dated mancur?
13..R C stamped on the spring of the DLO.
14..R S on DLO graduated in 10 to 120 PUDS, (Russian commercial weights.)
15..Geo Salter & Co had mancurs in their catalogues of 1888 and 1893.
16..J Georg Sessler was working in Maintz between 1750 and 1769.
17..See also André Letermelier.

With thanks to Aimé Pommier, William Doniger, Bernard Lagache, Henri Gacon, Hans Jeneman, Maurice Stevenson, Norman Cima, Joel Malter, Günter Unselm, Musée Le Secq des Tournelles à Rouen, Sjeord Bruinsma, Russell Stevens, Avery Historical Museum, Lou uit den Boogaard, Conservatoire National des Arts et Métiers, John Lound, Lewis Weiss, Sotheby's Auction house, Science Museum London, Robert Montagut, Dirk Schmitz and the late Morton Wormser.
See particularly Le Système métrique, pages 129 to 143, pages 722 to 731, and pages 808 to 810.

Contemporary Comment

11th August, 1835.

.....Others have devoted their attention to supersede the employment of weights, by the use of oval or spiral springs, and have produced very effective and perfect instruments, with all the accuracy necessary for their intention,– such as Marriott's Dial and Salter's Spring Balance. But no person has yet availed himself of the effects which are to be derived from the union of the two principles already adopted. It is then, ...that I propose a machine of very easy manufacture and small expense, by combining the lever with the spring balances of Marriott or Salter, which appears to offer many advantages over either used alone.....It is obvious that with a combination of this kind, and using one of Marriott's Dials calculated to weigh 2 cwt., we may readily make it available for weighing a ton.....Charles Coathupe to The Mechanic's Magazine.

More on Union Scales

By G NEWALL

Here is the method of working to establish the forces at the various points in a compound lever system. This is but one of many aspects which helped in the maintenance and overhaul of the machines.

The "Theory of Moments" states, in plain words, that for equilibrium the sum of the clockwise moments must equal the sum of the anti–clockwise moments.

On a loaded 2 lb. beam scale, for example, the load of 2 lb. at 6½" from the fulcrum, would be a clockwise moment and the 2 lb. weight on the left–hand end would be 2 lb. x 6½" from the fulcrum anti–clockwise moment. The distance – in this case 6½" – is measured at right–angles to the force.

Applying this to Fig. 10, page 1810:–

Let us assume a centrally placed load of 16 lb. on the platform which will give a downward force of 8 lb. at C and also 8 lb. at D. FC=2. FA=4. BE=4. DE=2 FG=16.

Taking moments about E, we get 8 lb. x 2 = 4 x B lb.

therefore B = 4 lb. (and therefore A = 4 lb.)

Now on the long lever, taking moments about F, we get 8 lb. x 2 + 4 lb. x 4 = 16 G.

therefore 16 G = 16 + 16

so G = 2 lb.

So now we know that there is a downward force of 8 lb. at C, 4 lb. at A, 8 lb. at D, 4 lb. at B and an upward force of 2 lb. at G but loads at F and E are so far unknown.

So, on short lever take moments about B, in which case 8 lb. x 2 = 4 x E

therefore E = 4 lb.

Then on long lever moments about G show that 4 lb. x 12 + 8 lb. x 14 = F x 16

therefore $F = \frac{48 + 112}{16} = 10$ lb.

If the load is not central then the downward forces at points C and D would have to be established first, by moments.

My thanks to Geoff for explaining the mathematics. I thought that I had struggled through Brauer successfully but I fooled myself, and I must have confused ISASC members. I apologise. D F C–H.

Old Adverts

Sears Roebuck & Co. show a Union scale in their catalogue of 1908, under their Household and counter scales, on page 470, for $3.73 for the single beam version. It says "The most remarkable scale value ever offered. Guaranteed for ten years. A high grade scale at the price usually charged for inferior goods. Our international scales are made for us in immense quantities by the most widely known scale manufacturer in this country, a manufacturer who has been making the highest grade scales so long that his name has become a household word in connection with scales. If we sold this same scale under the manufacturer's name, we would be compelled to charge you double the price we ask as we can only buy them at this remarkably low price with the understanding that they shall be sold under our own brand. The quality of the scale is the best and is identically the same as the highest grade union scale sold to the trade at double

the price we ask. The bearings are of oil-tempered tool steel, finely ground and well seated. The beams are of solid brass, highly polished and are marked by half ounces on both sides. The capacity of the International Scale is 240 pounds by half ounces. Size of platform 10 x 13 inches; scoop 10½ x 19½ inches. Don't practise false economy by buying a scale so cheap that it will not be accurate, but buy the International and we guarantee you satisfaction. ....Shipping weight 42 pounds. With double beam 44 pounds. Price $4.13.

Because the binding of the catalogue is so tight, it is impossible to photocopy the advertisement.

Could the scale in the advertisement on the left be considered a Union Scale? It had a capacity of 240 lbs. "Only family scale with a Butter Salting Beam." Patented 18th Nov. 1884.

In 1927, Sears, Roebuck offered the Union scales as "High Grade Beam Counter Scales. Solid brass beams. These scales are legal in all states for use in trade and are an excellent scale for general use. Finished in red. ....Poises are equipped with adjusting screws. Single beam shipping weight 53 lbs..$12.40. Double beam shipping weight 56 lbs..$14.00."

Response to Irish Steelyard

By E P NEWMAN

In EQM, page 1834, you asked for a solution to the problem of markings on an Irish steelyard. You have virtually answered the problem in your own presentation. The coinage of Peru and the Netherlands, which was commonly in circulation in 17th century Ireland, (and also early in the 18th century,) did not have milled or decorated edges and it was commonly clipped and filed on the edges to steal a little silver. This would reduce the weight slightly.

The steelyard was obviously used by the person receiving the coin and who, therefore, could not give full proclamation value for any underweight coin. The receiver would need a scale to determine whether the coin was excessively reduced or modestly reduced. The compromise was to put a notch and marking on the steelyard which would balance if the coin was about 2% or 3% short weight. The receiver could reject the coin if it was more than 3% short and accept the coin if it was equal to or less than 3% short. The steelyard was just checking the average piece received and accepting it at its average value in pence.

The English silver sixpence and shilling were protected by law and probably not worth the risk of filing. They were accepted at full value if up to weight and, if not, then rejected.

For these of us who are not numismatists, the Netherlands coins that were circulating in Ireland were the Ducatoon, its half and quarter. The coins from other counties, (Mexico, Peru, Spain Portugal and France) commonly had their country of origin included in their designation, but, for unknown reasons, the ducatoon was just the ducatoon, without its country of origin.

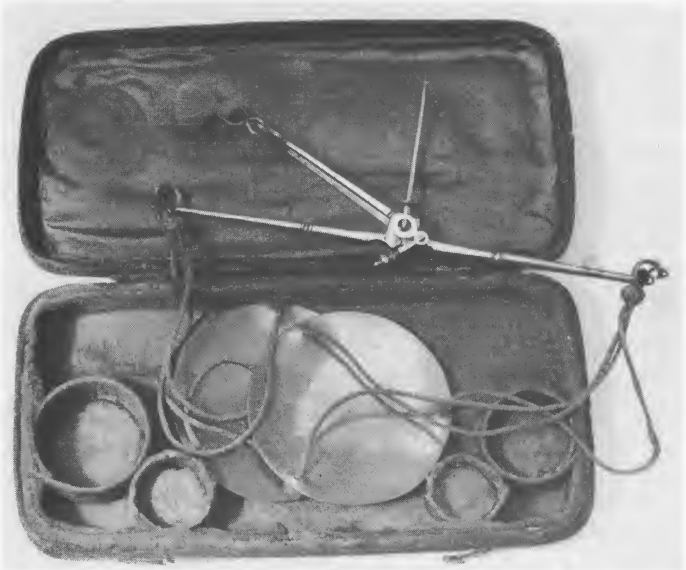
I think that defining the marks on the steelyard as stivers may be irrelevant, even though Gerard Houben implies, in his book "The Weighing of Money", that they were made for use in the Netherlands, (as they were marked in stivers,) to weigh the Frisian florin, the patagon, the ducaton of the Southern Netherlands and the Spanish real of eight. César Case asked for a Netherlands patent for a coin steelyard in 1685, and Houben shows a photograph of an incredibly similar steelyard to the one on page 1833 of EQM. Houben states that a few were stamped with an orb. The EQM one has a stamp like an inverted orb with a cross under it, but it has different numbers from those mentioned by Houben. Could the steelyard have been made in Holland for use in Ireland?

Borssum-Buisman goes into more detail in his book "Over Munt-Gewichten en -Balansen", pages 124 to 126, but my understanding of the language is so poor that I can learn little from him. He shows a photograph of one dated 1658, with a differently shaped load end, but with the same poise design and the same clip shape as the one on page 1833. The similarity between the three is so great that the argument for their having been made in the same place seems valid. D F C-H

English Colonial Scales, Part 3

More evidence. By G HOUBEN

I have to react to your comment on page 1819 of EQM. F Mateu y Llopis mentioned in his book "Catalogo de los Ponderales Monetarios del Museo Arquelogico Nacional", Madrid, 1944, on page 111, that Felipe II (1556–1598,) issued a silver coin called the Real, Real de a dos, Real de a cuatro and Real de a ocho, with a mass of 3,3 – 6,6 – 13,7 – and 27,4 g. These coins were also issued by Felipe IV (1621–1665,) [Mateu, page 125.] The first group has on the reverse a bundle of arrows, while the following series shows on the reverse the quartered coat of arms of Castille and Leon.



A better photograph of the scale shown as Fig. 3, page 1781.

A few years ago I studied the collection in Madrid, wrote a letter to Mateu and learned that coin weights for the second series were never produced in Spain, but – like many of the first type – mainly imported from France. All these have of course the mass indication in Deniers and Grains (see Dieudonné's book "Manuel des Poids Monétaires", plate X, no. 11/13 and Mateu, fig. 35/44.) F G Lavagne made a mistake with the dating of the French coin weights for the first series with the arrows, (in Archeonumis, Dec. 1974, pages 34/35, under no. E451c, 453c, 454a, and 455a; see also Dieudonné, plate X, no. 4/5.) Remarkable is that a few French coin weights with the indication PHILIPVS IIII show also the reverse of type one: a bundle of arrows, (see Mateu Fig. 45/47 and Dieudonné, plate X, no. 6 and 8/9.)

It does not surprise me much that a few related coin weights – even for the first series – but made in England, were also used in Spain. Probably because they were different in design from the

well-known French coin weights, the mass had to be checked by an adjuster. F G Lavagne pictured in Archeonumis, Dec. 1974, pages 39/40, under no. E654e, a round knobbed coin weight with VIII – 18 – 4 R, and one under no. E655e with XVII – ½ – 8 R plus marks of H ORTYZ.

There is no indication that in Spain a son could use his father's mark.

My conclusion is that your boxes were not for colonial purposes, but for use in England and that only the last box could officially be utilised in Spain and is probably the oldest.

Gerard is referring to monetiform weights throughout, until he gets to the last two references of Lavagne's. There has never been any argument about the origins or usage of the monetiform weights, as far as I know. The problems surround the knobbed weights only. Gerard put the cat among the pigeons by pushing their use back to the time of Ortyz between 1580 and 1634. All other clues suggest a date between about 1695 and 1715, including the clues in the last box. If the boxes were for use in England, as Gerard suggests, why were they not made to take the weights for the other coin weights used around 1700? Who would want to buy a scale box useful only for weighing reales, which were very rare coins in England?

By A G MALLIS

The matter of the Real (Reale) weights being used in Ireland could be a bit misleading, inasmuch as these weights were used in Colonial America at that time. In addition, in your "nicknames" for the Real (Reale) coinage you failed to note that in Colonial America these pieces were known, among other names, as "Spanish Milled Dollars", "Pillar Dollars", "Dollar of Spain" and simply "Dollars". In fact, the United States monetary system of dollars came from the previous use of the Spanish dollar.

You will find that, for the most part, scales in Colonial America were of European manufacture. From the mid-1700s, when all the original thirteen colonies came completely under English control, legal scales were made in England and then these were imported for sale to merchants and bankers within the colonies. As a matter of fact, the scale box noted in your article, from Sturbridge Museum, is an early Colonial artefact.

In the excellent work, "Studies of Money in Early America", edited by Eric P Newman and R G Doty, on page 41, you will see a label that indicates the weight of the dollar of Spain as 17 dwt. 6 grains and with a lawful value of 4s::6p, but with an actual value of anywhere between 4s::8p in South Carolina and Georgia, to 8s in New York and North Carolina. Later the "Dollar" was set at 17 dwt. 12 grains and had a lawful value of 6s, but in Massachusetts had a value of £2::5s in "Old Tenor". "Old Tenor" was the paper money issued by Massachusetts to finance King William's war in the 1690s, and which was supposedly backed by a reimbursement in hard money from the Crown. (See EQM, pages 356-360.) This did not occur until the mid-1745s and by then the "Old Tenor" had become almost worthless. As a matter of fact, it was this refusal of the Crown to allow the Colonists to have access to hard money that was the primary cause of our Revolutionary War. The "Stamp Act" was only the straw that broke the camel's back.

The Proclamation of 1704 and later the Act of Parliament of 1707, clearly reflect the English attitude towards the American Colonies by making it extremely difficult to obtain hard English money. It was thus that these resourceful Colonists turned to the Spanish for relief of their hard

money problems. Therefore, the "Spanish Milled Dollar", unofficially, became the staple hard currency of the American Colonies.

I seem to have misled at least two ISASC members. I wrote specifically about six sets of scales, which had knobbed weights only. I did not write about reale weights in general, a huge subject, as you will have gathered from this correspondence. There are more names for reale coins which none of us has mentioned, various degrees of wear or loss were acceptable at different times in different places, and they were valued differently. I was only discussing the ones accepted at weights of 17 dwt. or 17½ dwt. and those only if they were in use around 1700, when those scale makers were working. George gives a hint that dollars passed at 7½ dwt. at about the right date, but if they were called "dollars" why was the weight stamped "R" for "Reales"?

The scale box from Sturbridge Museum, EQM page 1779, had one very important feature. The box maker had decorated the box with book-binders' stamps. The fine detail of each of the stamps enabled Michael Crawforth to identify individual box makers, and to date the boxes by when the scalemakers who bought the boxes were working. They all fell within a working period of 1695 to 1715 (and that is probably a wider span than they were actually made,) and they all worked in London. One cannot categorically deny that a London box maker took his stamps to Colonial America and produced an "early Colonial Artefact", as George states, but I would be surprised if it had happened. Why shouldn't the box fit neatly into the category I suggest, of London sets of scales being used in one or more of the colonies? Is there some contrary evidence of which I am unaware?

I am sympathetic with the belief that the Crown had a particular desire to control the Colonists by refusing them access to hard currency in the 17th and early 18th century, but R E Solomon attributes the refusal to the law requiring Americans to buy English manufactured goods and pay for them in specie. I think myself that the refusal had more to do with internal currency problems, as discussed by D Westropp, R Ruding, Simon, W A Shaw, Sir I Newton, Sir J Craig and others. The result of various Acts caused appalling hardship in the Colonies, Scotland and Ireland, but people in England could not imagine the consequences of the Acts of 1704 and 1707, and they put their own needs first.

By E P Mahoney

These knobbed weights are so rare that I offer my variations on the theme. I have similar knobbed weights with XV D on the larger one, and VII½ D on the smaller one. They came with three square pennyweights, marked XVI, XII and VI P respectively. The latter three pieces have the punch CR. Have you seen this maker's mark? 

They conform to the Council Minute of Sept. 13, 1683, of the City of new York. "*fforasmuch as the Deputy Mayor and Aldermen of the City of New York have this day presented a petition setting forth the severall inconveniences & abuses committed for want of a certain rate of valuation to be put & established for the Currency of Spanish coyns: it is herefore Ordered, that all peeces of eight being Sevil Mexico, or pillar, not weighing lesse than fiveteen penny weight shall passe for six shillings & all Peru of the same weight (provided they be good silver) shall passe for five shillings, all halfe pieces at three shillings; all Quarters at one shilling & six pence & all Rialls at nine pence. Given under my hand this thirteenth day of September 1683.*"

Another set of the XV P and VII½ P, also round and knobbed, accompanied by a XII P square weight has a similar CR with the C nearer to the R in size. 

Given the possible date for these weights as c. 1683, could the mark be an official mark of Charles Rex, King of England at that time?

Siebe and Marriott

By D F CRAWFORTH-HITCHINS

Both men worked in London during the first half of the 19th century, with one joint venture in 1828, and some overlap of products, but always living and working at separate addresses. "A Short History of Weighing" by L Sanders, states "*...One of the most successful of these balances was developed by Augustus Siebe, who, in partnership with H Marriott, evolved from the early model [a lyre spring balance] the true elliptical spring balance.*" Siebe was patenting and developing spring balances as will be shown below, but no evidence has been found for a legal partnership. Sanders was the curator of the Avery museum, and it was Avery's own catalogue, compiled by Benton, that stated that the elliptical spring balance was developed by Edme Regnier in France in 1790. (See page 1869.) More research is needed into the early development of spring balances in the UK.

Henry Marriott

Judging by the entries in trade directories, Henry Marriott started in business slightly earlier than Siebe, in 1812, as a furnishing ironmonger at 64, Fleet Street. In 1813 he claimed to sell patent kitchen ranges, warm-air stoves, locks, humane man-traps and spring roasting-jacks, but probably only the roasting jack was patented by him personally. He took out more patents in 1824, 1825 and 1828, none of them for scales. The 1828 one was taken out with Augustus Siebe, machinist, of Prince Street, Leicester Square, for an improved hydraulic machine.

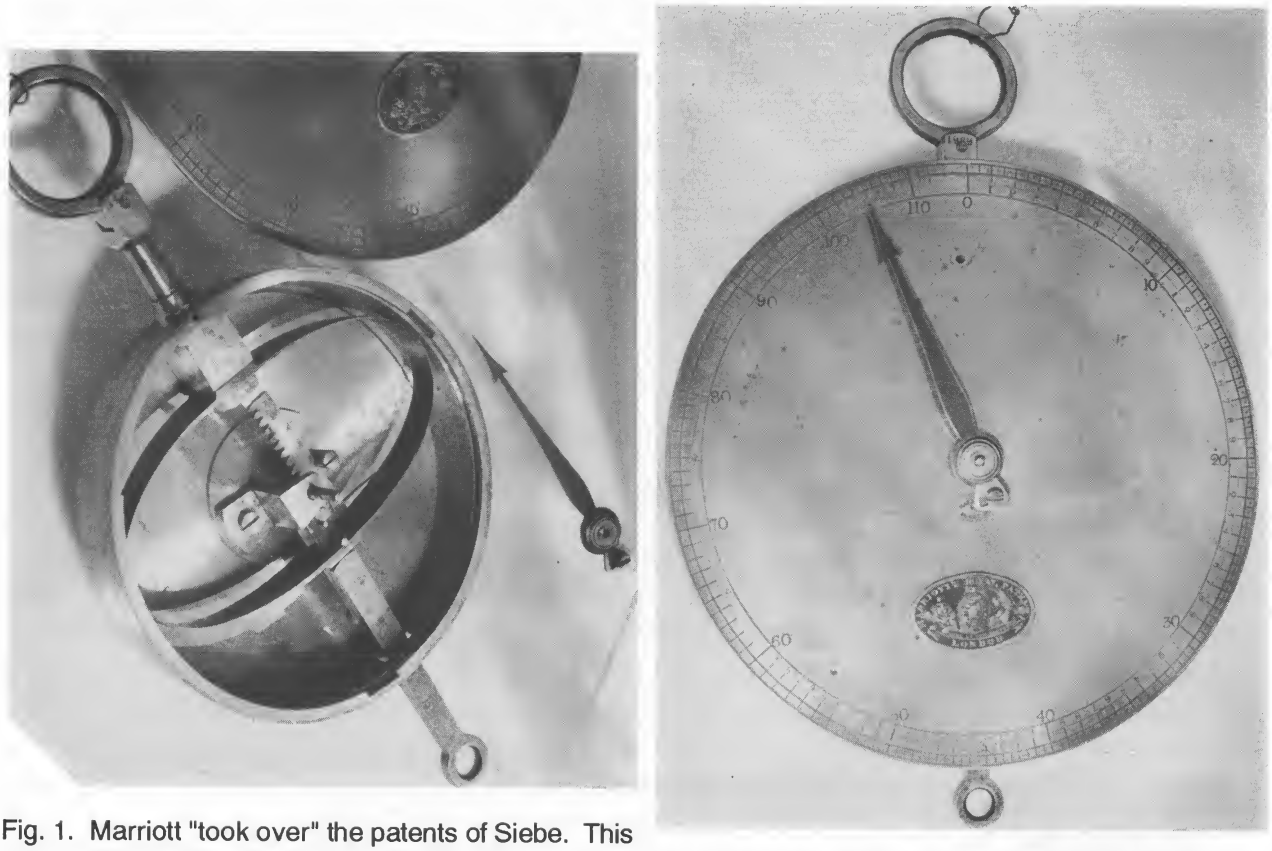


Fig. 1. Marriott "took over" the patents of Siebe. This single ellipse spring had a capacity of 112 lbs. Note the slots into which lugs on the dial fitted securely. The diameter of the dial is 8½" (205 mm.) The serial number 1989 is near the handle. As the address under the pointer is 64, Fleet St, it was made before 1836. The "box" is entirely of brass, and all parts bear the number 2. The flat pointer was of blued steel, with a brass adjusting ring round the pivot.

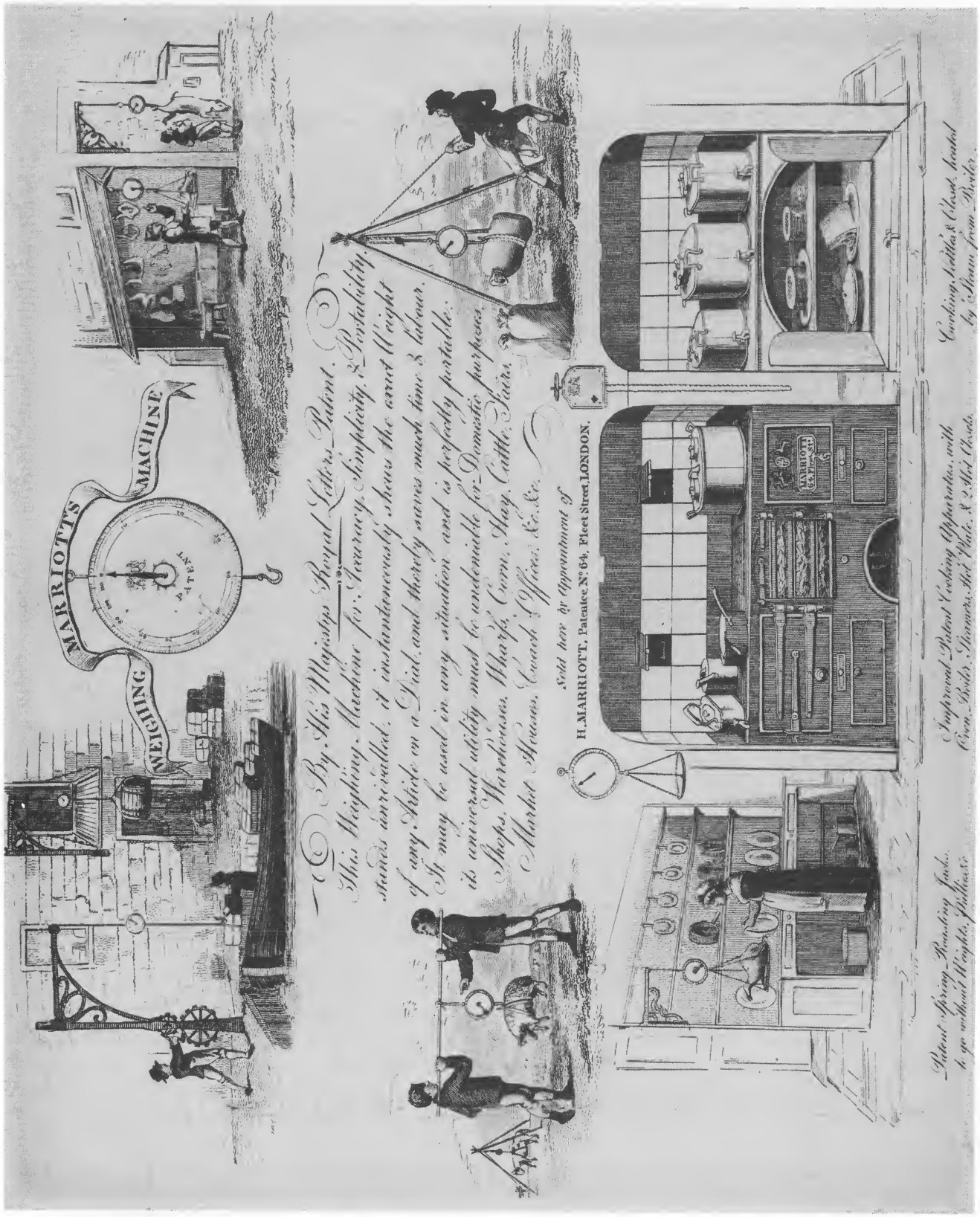


Fig. 2. Several trade cards of the Marriotts have survived. This is an early one, made after 1812 and before 1836, while Henry was still at 64 Fleet St. The dial at the centre top is the 112 lbs. capacity one, but the lettering and plaque position is different from that in fig. 1.

By 1836 Henry Marriott had moved to London House, 89, Fleet Street. He was there until 1848, according to trade directories, so some time before 1836, he started to sell dial face spring balances with an elliptical spring, using Siebe's patent. See Fig. 1, 2 and 3.

The story of his family got complicated in 1841. Marriott and Crowe were at 89, Fleet Street and at 26, Ludgate Hill in 1841. In 1844 and 1845 Marriott and Crowe were at 26, Ludgate Hill and at 74, Old Broad Street, and by 1848, Frederick Marriott was at 74, Old Broad Street only.

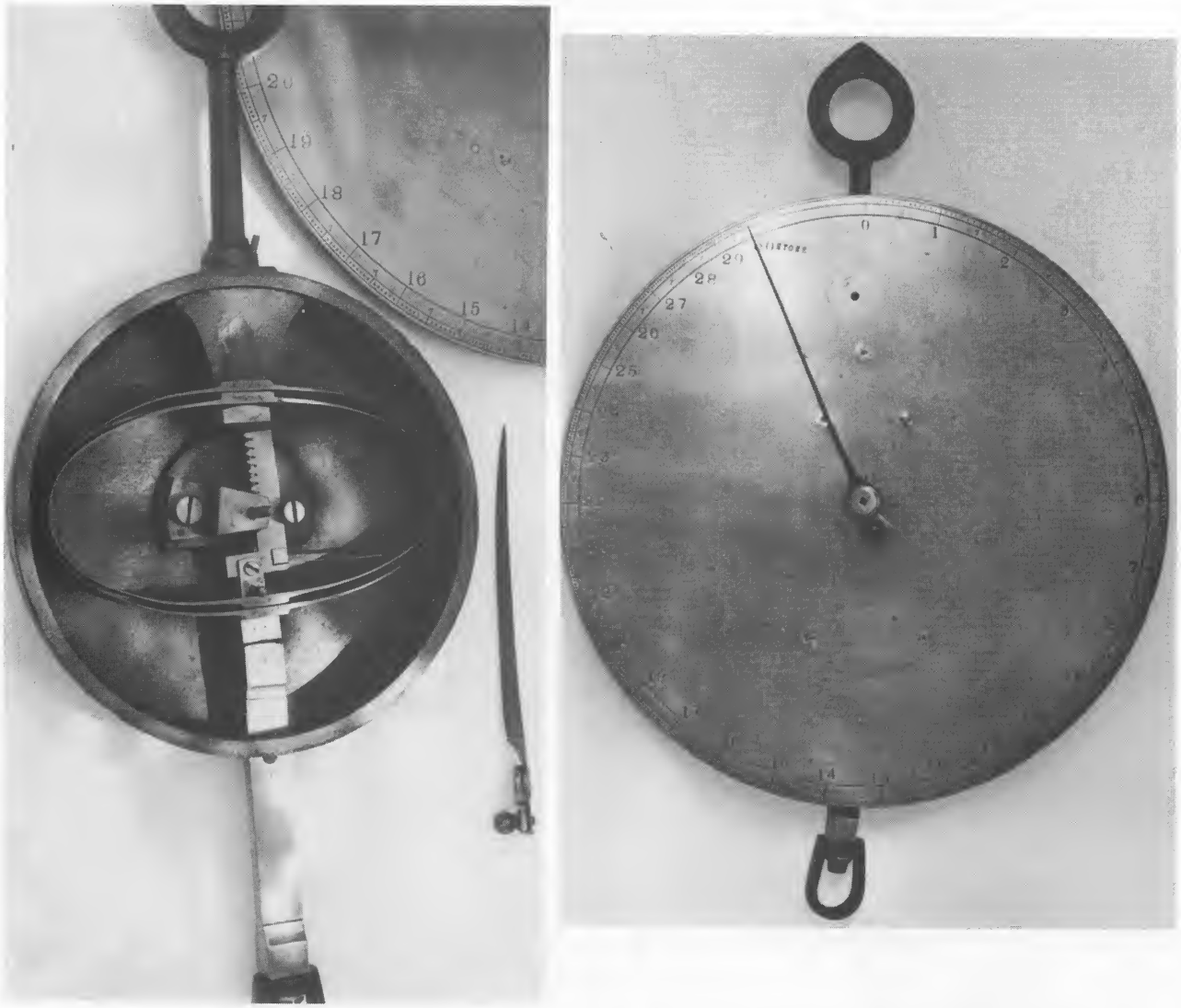
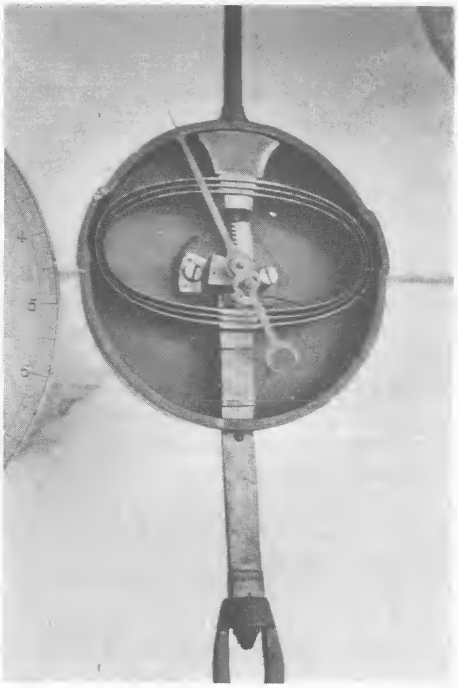


Fig. 3. To increase the capacity, the number of elliptical springs working in tandem was increased. This one was graduated to 30 stones, that is, to 420 lbs. The dial is 15" (375 mm.) diameter. The dial is held in by 3 brackets fixed to its back, with, through the brackets, screws that pinch the sides of the circular "box." The "box" is entirely of iron with the dial made of very heavy guage brass. Behind the pointer we found the numbers 17146 and 22¼ carefully stamped, significance unknown. Originally the plaque was mounted above the centre with 3 fixing screws, so was probably the style shown in fig. 5. Subsequently, the lower position had the plaque of the style shown in fig. 6. As the left-hand photo shows, the pointer is curved dornwards towards its tip, and a brass disc round its pivot could be swivelled and screwed to the pointer to give a fine adjustment to the direction in which the pointer pointed. The springs were brazed into an ellipse with a scarf joint at the centre top of each.

Fig. 4. Three elliptical springs in tandem in a rugged iron "box". The box was enlarged to leave room for the outer spring. The pointer was extended backwards to give a more even pressure on the pivot point.



In 1842, the Encyclopaedia Brittanica illustrated Mr. Marriott's dial face spring balance with a C spring, and rack and pinion to the pointer. This has not been seen by the author.

In 1849, William Adolphus Marriott was at 89, Fleet Street, and had an advertisement in the PO directory as "Ironmongers, stove and range manufacturers, patentees of the dial weighing machine, portable water closets, roasting jacks, and sole importers of enamelled saucepans, etc." William A Marriott was listed in the catalogue of the Great Exhibition of 1851, as a manufacturer of platform weighing machines, and in 1853, it was William A Marriott who signed an agreement with H Pooley & Sons (of Liverpool) so that Pooley's could make dial face spring balances with elliptical springs, (which they did for some years, until they went over to making them with two parallel helical springs with a bar.) Because it was W A Marriott who signed, not Henry, it is possible that Henry was either retired or dead by 1853.

The anomaly of having two firms at 89, Fleet Street between 1841 and 1848 needs to be clarified. It was not uncommon to have two firms at one address, but equally, it was not uncommon for one firm to have (a) its own name and (b) its predecessor's name in trade directories for three or four years. Until more work is done on the Marriott family, we must leave the problem unresolved.

Fig. 5

Fig. 6

Augustus Siebe

Augustus Siebe was born in 1788 and died in 1874, aged 86 years.

His first patent was taken out in 1819, no. 4358, (fig. 7) for an improved dial face spring balance with a spring or springs in elliptical form, and rack and pinion to the pointer. (Marriott's continued use of this patent is discussed on pages 1882–83.) The suspicion must be harboured that Siebe was patenting a system known to him from his childhood, although he does emphasise in the patent that "the effect of an endless spring be preserved (which is the leading principle of my invention)." He certainly made them very nicely, of heavy gauge materials, and easily opened for maintenance. He was at 6, Crown Street, Soho, when he took out this patent.

A.D. 1819, April 5.–No. 4358.

SIEBE, Augustus.– "An improved weighing machine."

The patentee states:– "My improved weighing machine consists of a box or frame, of any convenient shape and size, and containing a spring or springs of an oval form, thick at the top and bottom, and gradually diminishing in substance towards the sides; or, instead of an oval form, the spring or springs may be bent in various shapes, so as that the effect of an endless spring be preserved (which is the leading principle of my invention.) This spring is to be attached at the upper side to the handle or pendant of the machine (having a joint or not at pleasure), which passes through the rim of the box or frame, and also the spring must be attached on the lower side to a pendant rod with a hook or ring at the bottom for the purpose of suspending a scale weight or power. At the upper end of the last–mentioned pendant rod is an an arm connecting with a lever which is fixed upon the centre arbor, which arbor carries a hand or index moving upon a dial plate, and indicating the weight or power exerted by the pull of the pendant rod, and the consequent lateral extension of the spring. Or instead of the aforesaid lever I can apply a tooth rack, to be attached to a pendant rod to work into a pinion upon the centre arbor, and by the pull of the pendant rod this rack will cause the hand or index to point out the weight which is applied. At the bottom or heel of the rack is a small spring to keep the rack acting upon the pinion." The machine is also applicable to ascertaining the speed of ship or boat on its passage.

Fig. 7.

The patent for hydraulic machines was taken out with Henry Marriott, ironmonger, in 1828.

From 1836 to 1851 Siebe was at 5, Denmark Street, Soho. (G Medhurst then T Medhurst was at no. 1, Denmark Street contemporaneously with Siebe. Anscheutz & Schlaff and J S Clais had been in the same street in the 1770s. Was it an enclave of German immigrants?)

In 1851, Siebe was listed in the catalogue of the Great Exhibition as a maker of a dial face spring balance on a pillar, with a platform for the person being weighed. The illustration of it in the Complete Catalogue, in Class 10, page 358, shows a rather primitive drawing of a pillar with two dials. Fig. 8. Under a magnifying lens, it is clear that the bottom dial goes from 1 to 20, so presumably is graduated in stones. Had the upper dial something to do with the measuring rod that sticks out forwards? The rod is mounted below the upper dial, projecting forwards with a pendulous stalk hanging from its tip, with an inverted cup hanging from the stalk. If the measuring rod could be swung up or down through about 90%, and its hidden end was attached to a rack and pinion, the upper dial could give a reading in feet and inches. Has any reader seen a Siebe person scale?

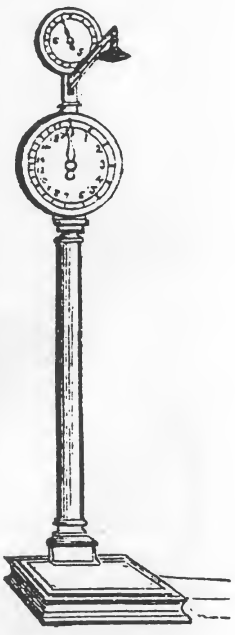


Fig. 8. *SIEBE, AUGUSTUS, 5 Denmark Street, Soho– Inventor and Manufacturer. New–constructed dial weighing machine, with measuring apparatus. The annexed cut shows the form of this machine.* From the catalogue of the Great Exhibition, 1851.

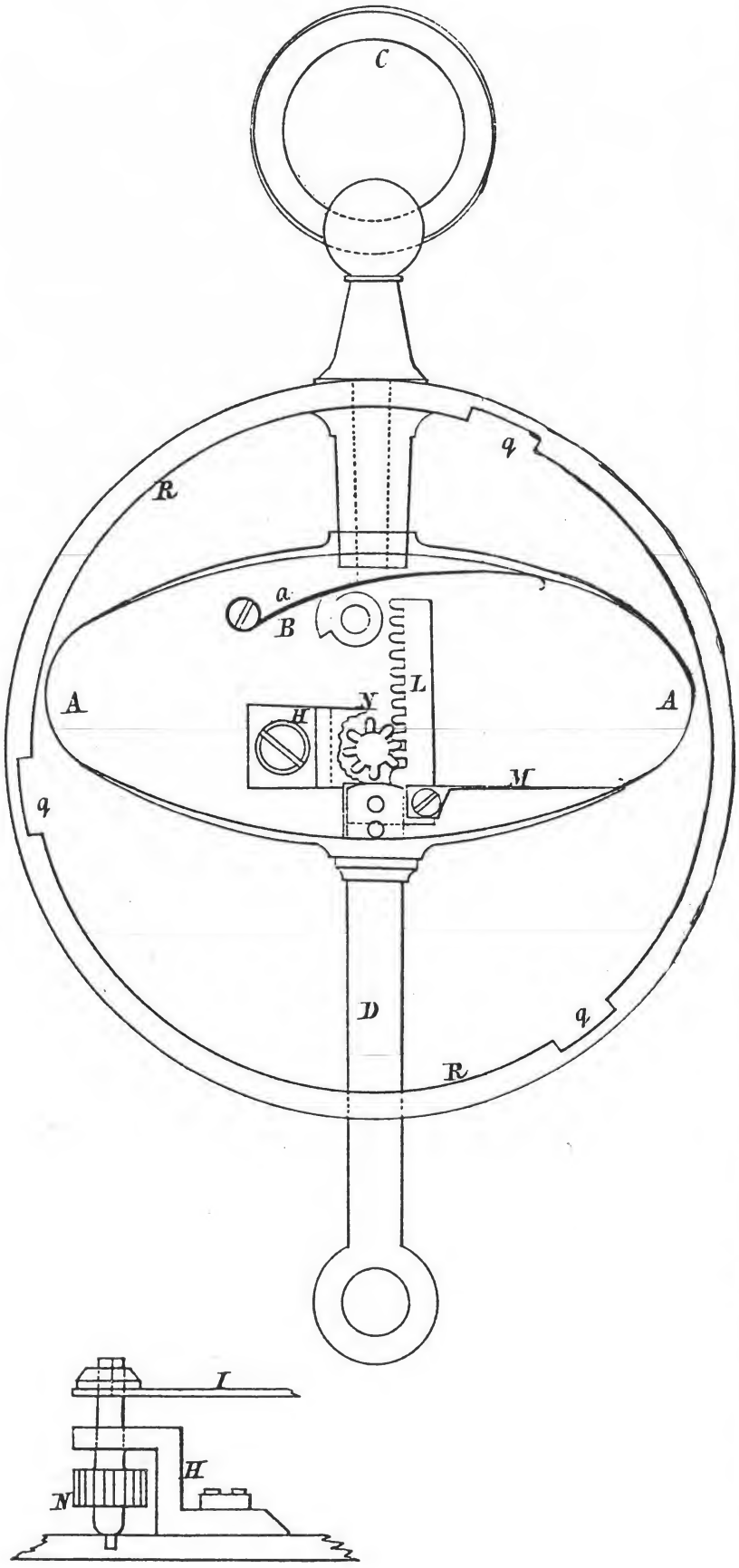


Fig. 9. From the full Patent Specification no. 4358.

A is the main spring or springs, either oval, or of any other endless form, the same letters referring respectively to the same parts in every Figure. (a) is the adjusting or compensation spring, (to keep the main spring at its proper degree of tension in the event of its being affected by temperature, which compens-ation spring is to be made of two or more metals of dissimilar expandibility.) B, the snail which forces or raises the adjusting spring against the main spring. C, the handle or pendant by which the machine is held or suspended, with or without a joint at C. D, the pendant rod, to which the scale weight or power is suspended. E, the arm attached to the pendant rod, and connected with the lever F. F, the lever upon the arbor or axis G. G, the arbor or axis that carries the index or hand, supported by H, the cock. I, the hand or index moving upon the dial plate. K, the dial plate, with its graduations. L, the tooth rack, with the heel spring. m, the heel spring, to keep the rack up to the pinion. N, the pinion upon the axis or arbor G, that carries the index I instead of the lever F, and supported by the cock H.

Note the suggested use of a spring to compensate for expansion, an idea not seen on any of the 18th century French spring balances shown earlier in this EQM.. This nice scientific feature was omitted in practice, perhaps because such a refinement was found to be unnecessary for the degree of accuracy obtained in practice with springs. It does, however, tell us something of the intellectual and scientific attitude of Augustus Siebe.

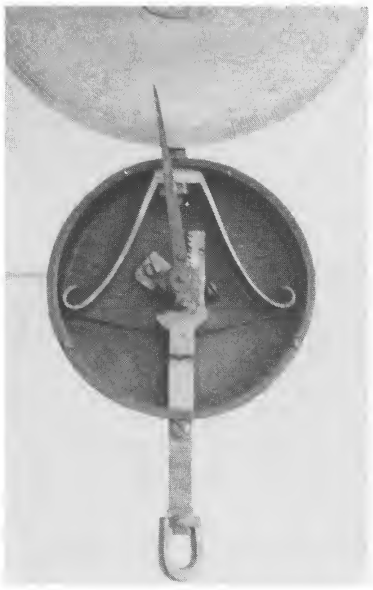


Fig. 10. This rare lyre spring balance has engraved on the dial, below the pointer, "A SIEBE, Patent, 5 High Holborn, London." We did not find a patent for it, and it does not conform to patent no 4358, as it has not got a continuous spring. Capacity 20 stones. Avery Historical Museum.

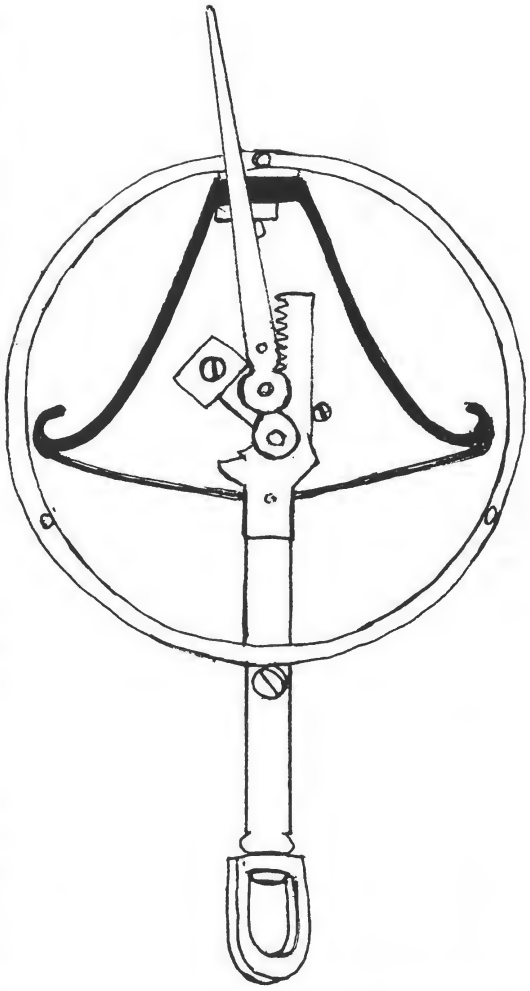


Fig. 11.→

While he was at 5, High Holborn he produced his dial face spring balance with lyre springs, and rack and pinion to the pointer. We do not know when he was living in High Holborn.

While at 145, High Holborn, he produced a circular spring balance marked A Siebe Patent, 0–20 stones by ½ lbs. (described by Benton, page 77.) Traditionally stones were used to graduate person scales, but many heavy commodities were weighed by the stone, (such as potatoes) so it may have been designed as a trade scale. Again, we cannot date this balance because Siebe was not listed in trade directories at this address. Augustus Siebe was the founder of the firm Siebe, Gormon & Co. according to Benton.

Fig. 13. A Siebe Patent, London. Capacity 10 lbs. Split ring as handle. Blued steel pointer. Knurled rims. Bedford W & M Museum.

Fig. 12. Siebe's pointer design. Blued steel.

Siebe made many sizes of helical spring balances, all with the pointer attached to a brass tube, running within an outer brass tube of the same length. Fig. 10. As with his circular spring balances, the quality was outstandingly high, with heavy guage brass tubes, blued steel pointers with two screws, split ring handles and knurled rims. He put no address on his helical spring balances, so, again, we cannot date them.

More on flexure springs in the next EQM.

ISASC

EQUILIBRIUM®

QUARTERLY MAGAZINE OF THE INTERNATIONAL SOCIETY OF ANTIQUE SCALE COLLECTORS

1995—ISSUE NO. 2

PAGES 1889-1916

PAGE 1890

Cover Picture

This Union Family Scale, a top–pan, dial–faced spring balance, has a little escutcheon where the tongue of the lion would appear. The escutcheon is impressed with the letters **EU**, the mark of Emil Ubrich of Fürstenbrunner, Westend, Berlin. The casing is painted maroon, with the lion and the bars, (by which one grips the scale), picked out in gold. The back is most handsome and looks very decorative with its face to the wall!

The scale is 10 inches (250 mm.) high, with the tinned pan 7½ inches (185 mm.) diameter. The face and the interior are shown on page 1909. The pointer and face were removed to gain access to the working parts. The casing was cast in two parts only, the back and all three legs as one casting, and the bottom third of the rim and all the big shield with Union across it as the other part. The latter part was screwed to the bigger part before it was painted maroon. Gold was used to high–light the rim and the shell at the top of the face, and the ribs and letters on the shield were painted gold. It was not an expensive kitchen scale, but it had great presence, and was accurate enough for weighing quantities between 1 lbs and about 15 lbs. Any cook must have cursed the small pan, which has a maximum capacity of 2 lbs (1 kilo) of flour. The cook needed to use a bigger bowl, and remember its weight when calculating the total of bowl plus ingredient during each weighing. When weighing under 8 ozs. (0.25 kilo), the cook had great trouble getting even an approximate idea of the weight because the pointer was nearly ½ inch in front of the dial (1 cm) so that the position of her head was crucial to the reading.

It was made for the English–speaking market, having "Family Scale" and 25 lbs on the face, with no obvious clue to its origins in Germany. There was considerable prejudice against German products in UK after the First World War, so perhaps we can tentatively date this model as circa 1920. It is very like other scales in Ubrig's catalogue of 1892, (shown, on page 1910).

INTERNATIONAL SOCIETY OF ANTIQUE SCALE COLLECTORS

Founded September, 1976

176 West Adams St.* Suite 1706 * Chicago, IL 60603 * USA * Tel. 312/263-7500

EQUILIBRIUM is published quarterly in January, April, July and October.

Editor--Diana Crawforth-Hitchins, 15 Hawthorn Ave., Headington, Oxford OX3 9JQ, England.

Associate Editor--Ruth Hendricks Willard, P.O. Box 27565, San Francisco, CA 94127, USA.

ISSN-0893-2883

Local Verification Marks

By N BIGGS

The Administrative Background PART ONE -- before 1830

The Local Verification Marks Project

This article describes the background to a current project, the aim of which is to facilitate the identification and dating of old weights by means of the verification marks stamped on them. This usually involves consideration of documentary evidence as well as the evidence provided by the weights themselves. The subject is much larger than might be thought, because weights were used very extensively in trade over a very long period. Furthermore, we need to understand not only the weights themselves, but the administrative arrangements which supported the mechanism for inspection and stamping. In order to keep the project within reasonable bounds, the initial programme is focused on weights used in England, and is concerned mainly with the period from 1795 to 1974.

Theory and practice

The notion that a pound of salt in London should be the same as a pound of salt in Bristol is one which has appealed to tidy-minded Englishmen throughout the ages. In medieval times two great administrators, Hubert Walter (1197) and Walter Stapledon (1321) sought to achieve this by distributing standard weights and measures throughout the realm. No doubt they hoped that sellers of salt could be compelled to check their weights against the standards, either because they were required to do so by law, or because people would refuse to buy salt from merchants whose weights had not been checked.

Unfortunately, it took many centuries for the theory to become a practical reality. In the first place, it proved remarkably difficult to construct and distribute standard weights which would be acceptable everywhere. Several attempts to do this were made, with varying degrees of success, but it was not until 1588 that the first truly comprehensive distribution of standards took place. (The details of the problems are not relevant for our purposes; but they are clearly described in Connor's *Weights and Measures of England* [1]). An even more serious difficulty was that there had to be an effective mechanism for inspecting weights at the local level. It was no good sending standard weights to Bristol if there was no one in Bristol who could enforce their use for checking the weights of local merchants.

Ideally there are two separate stages in the implementation process. The first step is to ensure that merchants' weights are checked against the standards, and the second step is to prevent the use of false weights. One way of trying to implement the second step is simply to destroy weights which are incorrect, but this does not prevent a merchant acquiring a new set of false weights and continuing as before. A more effective policy is to mark correct weights when they are inspected, so that every time they are used the customer can see that they have been checked. Of course there are opportunities for mischief here too, and it was to be many centuries before all the problems were finally overcome.

The position before 1795

In order to set the scene, a review of the story of weight-stamping before 1795 is needed. Even this brief account contains facts which are not widely known, and about which more research is needed.

There are scattered references to the inspection and marking of weights throughout the 14th century. These indicate that the authorities of the time had conceived a policy of using the Livery

Companies of London as their agents for checking and marking weights; indeed the Goldsmiths' Company had already acquired that function with respect to bullion weights by 1370. In the case of trade weights, the records of the Grocers' Company [2] reveal that in 1386 they had standard weights and a *'punch for marking the weights'*. In the same year there is a record of money received for *'sealing'* weights, but unfortunately there are no details of the punch-mark used. It is possible that the mark was a crown, because that mark has been seen on a number of 15th century trade weights found in London. There are several varieties, and it occurs on both lead and copper-alloy weights (Figures 1 and 2).

Fig. 1. On the left, simple crown: on 15th century bronze weights.

Fig. 2. On the right, ornate crown: on 15th century bronze weights.

A century later, there is more specific information. An Act of 1494-5 (11 Hen. VII c.4) decreed that standards were to be delivered to the county towns of every county, and a few other places. The officers of *'all cities boroughs and market towns'* were to make copies of these standards, and to use them to check the weights used by merchants within their localities. If the weights were correct they were to be marked with the letter **h** crowned, and no other weights were to be used. Although it is clear that this procedure could not have been universally adopted, there is artefactual evidence that it was implemented in several places. Weights which bear the mark of a lombardic **h** surmounted by a crown (Figures 3 and 4) have been found in many parts of the country. The fact that there are a number of varieties of this mark also suggests that it continued to be used well into the reign of Henry VIII. But there is little specific information about the localities in which the mark was used, and how the procedure for checking and stamping was carried out.

Fig. 3. On the left, crowned **h**: on Henry VII and Henry VIII bronze weights.

Fig. 4. On the right, crowned **h**: on Henry VII lead weight.

In order to find firm evidence of an established mechanism for the regulation and stamping of weights, it is necessary to read of the City of London following the issue of standards in 1588. By this time the Grocers' Company had lost its influence, and the Founders' Company acquired the right to mark 'brass' weights for London. The story of how they achieved this right, and continued to exercise it for nearly three hundred years, will not be repeated here, since it is well-documented. [3 and 4] Four marks were used: the sword of St Paul (representing the City), the ewer (representing the Founders'), the letter A (Averdepois) and the royal cypher. In the case of lead weights, there is some evidence that the Plumbers' Company was involved well before 1588, and it is certain that they were stamping lead weights in London from around 1590 onwards. Their distinctive mark was the device of the angel St. Michael carrying a large pair of scales.

There is ample evidence that weight-stamping by the Founders and the Plumbers was an established practice in London throughout the 17th century. But there is little to suggest that many other places developed a system comparable with the London one. Although all the county towns had received copies of the standards in 1588, it is clear that many of them still did not have the kind of local organisation which would support a system of regular inspection and stamping. Even where there was a mechanism for inspection, there was not necessarily a mechanism for

stamping also. It is probable that some local authorities were content to deface false weights and fine their owners, and did not resort to the use of verification marks.

Paradoxically, the places where there was a suitable framework for regulation were those in which the town itself had set up a form of local government quite separate from its County. These were, roughly speaking, the seventeen towns which were classified as 'counties corporate'; they included, for example, Bristol, Exeter, Hull, Norwich and Coventry. Of course, it must be remembered that the relative importance of these places at that time was quite different from what it is today, so that, for example, Norwich was arguably the second most important centre of commerce in the country. Thus it is no surprise to find that there is an extensive series of weights from Norwich, stamped with the town mark of a castle and a lion (Figure 5). It is sad that very little work has been done to establish the details of the arrangements in 17th century Norwich, although documentary evidence undoubtedly exists. It is possible that a few of the other counties corporate, such as Exeter and Hull, also operated a system of weight–stamping, but here too there is still much research to be done.

Fig. 5. On the left, Norwich: on a Queen Anne lead weight.

Fig. 6. Westminster: on a bronze weight, c.1800.

Moving on to the 18th century, there are documentary references to the inspection of weights and measures in a wider variety of contexts. Perhaps the most important case is that of Westminster. By the 1750s the urban area of London had extended well beyond the City itself, and in particular it covered much of Westminster, which was governed by a Court of Burgesses established in 1585. It appears that they had been involved in the inspection of weights and measures, by various means, since that time [5]. This function was expressly sanctioned by two Local Acts of 1756 and 1758 (29 Geo. II c.25 and 31 Geo. II c.17). These Acts allowed the establishment of an 'Annoyance Jury', partly to guarantee the cleanliness and safety of the streets, but also to enforce regulations about Weights and Measures. More specifically, the second Act says that correct weights were to be *'marked with a portcullis'*, part of the arms of the City. This mark (Figure 6) has been found on many weights, some of which can be attributed fairly confidently to the late 18th century. Its use continued, with minor variations, until the City of Westminster became part of the newly–formed London County Council in 1889.

There are many isolated references to the inspection of Weights and Measures by local authorities in the 18th century, but in most cases there is no link between the documentary evidence and artefacts, and there is no clear description of the marks (if any) which were used. Three examples will illustrate the diversity of practice. In 1738, standard weights and measures were acquired by the Vestry which governed the Parish of Tooting in Surrey, but it is not recorded what use was made of them. [6] In the following year 'Surveyors and Searchers of Weights and Measures' were appointed for the Eastern and Western divisions of the County of Essex. Their business was *'to go to the several parts of the county and examine the weights of all millers and shopkeepers and make return of those in whose possession any light weight is found'*. This practice continued for many years thereafter. [6] In 1785 the Mayor of Ripon obtained a new set of standards for the use of the Borough, and shortly afterwards the Common Clerk issued a Notice reciting the ancient laws about false weights and measures, and warning that they would be *'strictly put into execution against offenders'*. Many similar examples of documentary evidence could be given.

But there are few surviving examples of the standard weights used, and correspondingly few weights bearing marks which can firmly be identified as indicating that they had been checked against those standards.

The Act of 1795

By the end of the 18th century a skeletal administrative structure had appeared in all the traditional counties. It was based upon the system of local Justices of the Peace and the courts which they held in each quarter of the year, known as the Quarter Sessions. The organisation of this judicial process required officials such as a Clerk of the Peace (an administrator), and a High Constable (who was responsible for law enforcement). This framework gradually acquired additional functions, simply because there was no alternative. Thus it was that an Act of 1795 and an amending Act of 1797 (35 Geo. III c.102 and 37 Geo. III c.143) provided that 'examiners' of weights and measures should be appointed by the Justices. Each county was to purchase standard weights and measures, paid for by the county rate. In many counties (for example, Berkshire, Cheshire, and Hampshire) the Justices took the obvious step of appointing the High Constables as the examiners of weights and measures, but in some counties (for example, Hertfordshire) they appointed another person specifically for that task.

The duties of the examiners did not specifically include the stamping of verification marks on weights which had been checked and found to be correct. However there are many weights from around this period which have been stamped with some form of crowned GR (Georgius Rex) mark (Figure 7), and it is tempting to think that such marks were stamped by the examiners appointed under the Act of 1795. On the other hand, it is also possible that some of these marks were applied by the makers of the weights, in order to give them a semblance of official approval.

Fig. 7. Crowned GR: on early 19th century bronze weights.

The units of local government in the 19th century

At this point it is important to stress that, despite the apparent uniformity provided for in the Act of 1795, the system of local government around 1800 was, in fact, quite incoherent. The problem was that the jurisdiction of the counties did not extend to all the places geographically within them. Furthermore, the places which had (or claimed to have) separate jurisdiction were themselves of many different kinds, there being at least four main types.

First, there were **Liberties.** These were of several types but the most important ones were large parts of a county which claimed to be exempt from the jurisdiction of the county because of ancient privileges. Their claims were usually based on the authority given by the crown to great Abbots and Bishops in the Middle Ages. A good example was the Liberty of St Albans, which accounted for about one quarter of Hertfordshire, and was not completely united with the county until 1874. In Suffolk two of the four divisions of the county were Liberties: the Liberty of St Ethelred's (based on Woodbridge), and the Liberty of Bury St Edmunds. The former was gradually assimilated into the county during the first part of the 19th century, but the latter clung tenaciously to its independence, and on the formation of County Councils in 1889 it became the separate administrative county of West Suffolk.

Second, there were **Boroughs.** Until 1835 it was not clear in law what constituted a borough; some of them had (or claimed to have) an ancient charter, but many of them were 'boroughs by prescription'. This meant merely that they passed certain tests of what a borough should be, and acted as if they had a legal status. The boroughs ranged from the largest towns (including the

'counties corporate' mentioned above), to places like Dunwich and Orford which had once been important but had largely fallen into the sea.

Third, there were **Manors**. These were relics of a more feudal kind of local government, based on the authority of a Lord of the Manor, and in which a so-called Court Leet was responsible for many aspects of local affairs. A typical case is provided by the Manors of Watchet and Williton in Somerset, where the Earls of Egremont were Lords of the Manor. There are extant standards used by them, going back to the 18th century. A less typical case is that of Manchester, which, surprisingly for such a large town, remained under the control of a Lord of the Manor (Sir Oswald Mosley) until 1838, when it became a borough. The authority over weights and measures was not transferred to the borough until 1844.

Finally, there were **Parishes.** Traditionally, a parish was a small rural unit with a few hundred inhabitants, but the growth of London meant that some places of this kind gradually became densely-populated urban areas. The most notable examples were St Marylebone and St Pancras, both of which were governed by a Select Vestry. A vast amount of detail about the operation of this curious form of government is to be found in the Webbs' classic work, *English Local Government* [6]. From our point of view, the relevant fact is that in both parishes the Select Vestry obtained the right to inspect and stamp weights by means of a Local Act, St Marylebone in 1795 (35 Geo. III c.43) and St Pancras in 1819 (59 Geo. III c.39).

At the other end of the scale, we have the curious case of Hampshire, which contained a large number of parishes, many of them with only a few hundred inhabitants. For some reason the Hampshire Justices decided that each parish should have its own set of standards, an abuse of the county rate which seems to have gone unchallenged.

Even the foregoing catalogue of disorganisation does not completely describe the situation, because there were a few yet more anomalous jurisdictions. For example, the ancient universities of Oxford and Cambridge were the weights and measures authorities for their respective towns, and continued to exercise this function until the middle of the 19th century.

From 1800 to 1830

Throughout the 19th century the improvement of procedures for verifying weights and measures went hand in hand with the rationalisation of local government structure. As already noted, there was much to be done on both counts.

The first stage was a period of consolidation of the 1795 legislation. The requirement to appoint examiners was repeated and extended to boroughs by an Act of 1815 (55 Geo. III c.43). By and large it seems that the boroughs were slow to implement this Act; for example it was not until 1828 that the city of Southampton was moved to appoint *'a proper weights and measures inspector',* as the record has it.

Fig. 8. On the left, London: on brass and bronze weights 1826 onwards.

Fig. 9. On the right, Westminster: on bronze and brass weights 1826-1882.

A much more wide-ranging piece of legislation was the Act of 1824 (5 Geo. IV c.74) which established the Imperial Standards. The main provision was the legalisation of a standard pound and a standard yard, from which all other weights and measures were derived, but there was also a recapitulation of previous Acts relating to examination of weights and measures. In particular, counties, boroughs, and other local authorities were required to purchase verified copies of the

new Imperial Standards, and to use them for checking weights in everyday use. This provision seems to have been fairly effective, since there is documentary evidence that the new standards were distributed very widely indeed, and many of them still exist. Another sign of the change was that some local authorities incorporated the date 1826 (when the Act of 1824 came into force) into their verification marks. Specifically, such marks were used in the Cities of London and Westminster, and the Parishes of St Marylebone and St Pancras (Figures 8, 9, 10 and 11). These marks cause some confusion, because they continued to be used for many years (until 1882 in the case of Westminster,) without alteration of the date. Thus a weight which bears a portcullis with the date 1826 may have been stamped more than fifty years later.

Fig. 10. On the left, St Marylebone: on bronze weights 1826–1834

Fig. 11. St Pancras: on bronze weights 1826–1834

The situation in 1830

In 1830, when the new king, William IV, ascended the throne, the system of local government in England was irrational, ineffective, and undemocratic. But reform was in the air. Politically the most explosive issue was the reform of parliamentary representation, especially that of the old 'rotten boroughs'; this was the subject of the great Reform Bill of 1832, and it was followed in 1835 by a reform of local government. In the second part of this article it will be shown how the Act of 1835, together with contemporary Weights and Measures legislation, lead to a remarkable increase in the stamping of weights and measures. Indeed, it is not too much to say that the Victorian era was the hey–day of weight–stamping in England.

References

1 Connor, R D, *The Weights and Measures of England*, HMSO, London, 1987.
2 Kingdon, J A, *The Strife of the Scales*, Rixon and Arnold, London, 1905.
3 Stevenson, M. *Weight Stamping by the Founders Company*, London, 1991.
4 Parsloe, G, *The Warden's Accounts of the Founders Company 1497–1681*, Athlone Press, London, 1964.
5 Manch, W H, *The Westminster City Fathers 1585–1901*, Bodley Head, London, 1924.
6 Webb, S and B, *English Local Government -- The Parish and the County*, Longmans, London, 1906, p.58 and p.524.

To be continued in the next EQM.

Contemporary Comment, 1824

On the 18th August 1824, Captain Kater ordered me to prepare; to make experiments; to submit to him patterns & designs; to employ the best artists...I spent 2 days in preparations & I can truly say that from the expiry of those 2 days to the 20th Oct 1825, a period of 14 months, I was *devoted* to the execution of these standards, denying myself to other calls during the hours of business & not beginning any other work 'till after 8 pm, which very frequently engaged me during 6 & sometimes 8 hours more to the injury of my health & derangement of my family from which I have greatly suffered...I did not touch any other Standards, except the working set of Measures for the Exchequer, or make advantage of them in any way, 'till the end of those 14 months, but lost many orders & had others countermanded because I could not execute them when others did; I was rendered incapable of undertaking the new Rules for the Excise, with several other things of similar importance.

During this hurry & abstraction from my ordinary business it has fallen into such arrears that I have not been able to restore it or to draw up an account of my processes, but I humbly refer your Lordships to Captain Kater's paper in the Philosophical Transactions for a statement of their results & for his testimony to the efficacy of my exertions.

The period when I was thus called upon was that in which our workmen were the fullest of employment they were ever known to be, when the difficulty of getting additional hands was extreme and that of inducing anyone to undertake those parts which were too heavy for me was so great that I applied to 4 of the most competent in London without success altho' they were told that I had orders to pay them well.

The prelude to an invoice for £5297..10..11. Robert Bretell Bate wanted to be paid at a rate higher than that of the Commissioners of W & M, who were to accept the invoice!! After arbitration he received £3626..3..0. Read R B Bate of the Poultry by A McConnell for more of the story!

More 'Irish' Steelyards

By R HOLTMAN

EQM, page 1877, showed an "Irish" steelyard from the Pitt-Rivers museum in Oxford, no. 1884.97.1. This steelyard was for weighing silver coins, with the value of each given in 'stuivers', a small Netherlands coin that one might call a 'penny equivalent'. (Refer to Table 1, no. 1.)

Bruno Kisch showed one in *Scales and Weights*, fig. 27, pages 63 and 65. He said that it was used in Norway. (Refer to Table 1, no. 2.)

Fig. 1. The less common type of 'knipwaage', showing the units 6-12-28-35-56-70 and 29-58. Refer to Table 1, no. 12.

Gerard Houben showed the same steelyard in *Meten & Wegen*, page 604, but he discussed a different steelyard, with the graduations 6-12-24-31-30-48-63 on the front of the blade and 7-14-25-28-50 on the reverse. (Refer to Table 1, no. 13.) He included a graph showing the weight of each coin in grams, using Enno van Gelder's *De Nederlandse Munten* to help him to identify the coins weighed by the steelyard. (Houben also referred to another steelyard marked in units of 30-40-50-60-70, similar to the ones that we have discussed over the last three EQMs. This steelyard was obviously made at about the same time, but for different coins, and probably made by a different maker. We will not deal with this steelyard, as the units seem to be associated with something very slightly heavier than the stuiver. However, this does raise a problem of identification with the units on the steelyards that we are discussing, when they were marked 30, 50, 60 or 70.)

The one that Houben discussed was the regular type used in the Netherlands, of the type recorded in six collections. The only minor variation between them was at around 60-63-65 stuivers. The six are in the Table 1, numbers 6 to 11.

Gary Batz recorded one. He referred to a "1680 knipwaage without a clip", with the regular 6-12-24-31-30-48-63 and 7-14-25-28-50. (Refer to Table 1, no. 14.) Presumably the date was

Number punched on the steel-yard	Official weight in grams	Actual weight in grams recorded by G Houben	Actual weight recorded by D Hitchins	Official weight of the coin in Stuivers	Coin
6	3.4	3.4			eighth of Spanish Reale
7	4.87	4.8		7	¼ Florin of Friesland
12	6.8	6.8	7.6		¼ Spanish Reale
14	9.75	9.7		14	½ Florin of Friesland
24	13.7	13.5			½ Spanish Reale
25	14.5	14.5		25	½ Nederlandse Rijksdaalder
28	19.5 / 14.3	19.6	15.3	28	Florijn with double eagle of 28 stuivers
29			16.1		?
30	20.7	20.5		30	Zeeuwse ~~or Friesland~~ arendaalder
31	16.4	16.3		31½	½ silver Rijder / ½ ducaton
35			18.5		?
48	27.4	27			Spanish Reale, piece of 8
50	29	29		50	Nederlandse Rijksdaalder
56	31.21		28.5	56	Double Florijn of 28 stuivers
58			29.7		?
~~60~~				60	? ~~Double Arendaalder~~
63	32.8	32.5		63	Silver Rijder / Ducaton
65					?
~~70~~			33.5		?

Table 1. So many coins were minted out of silver, all of approximately the same weight and of similar alloys, that it makes it very difficult to identify specific coins by weight or value. The dollar/ thaler/ taler/ crown coin was particularly useful in all countries and so numerous variations were minted. The date at which the coins were current helps to identify them. Contemporary documents help, but some countries discouraged the publication of comments about the coinage and its shortage, because comment implied criticism of the government.

The illicit flow of silver coinage between countries was a severe problem during the 1600s, discussed by Shaw, in *The History of Currency*, with some passion. He spelt out the problems caused in Britain by the different value placed on silver coins relative to gold coins (bimetallism) in some detail, quoting the relevant contemporary documents. What was causing problems in Britain was creating prosperity in the Netherlands, as Netherlands' merchants were (legally) importing English silver coins into the Low Countries in enormous quantities, with the vigorous support of some goldsmiths in London, who were (illegally) able to make private fortunes out of the trade. See page 1901.

NB. The line under the 1 in 31 indicated "and a half".

on the steelyard. Gary Batz is of the opinion that these steelyards were introduced after the coinage reforms in the Netherlands in 1659. We look forward to his paper on the subject.

Wittop Koning and Houben in *2000 jaar gewichten in de Nederlands*, pages 153 and 155, showed a knipwaage with the regular 7–14–25–28, (Table 1, no. 13,) but with a double lobe at the top of the clip–end of the beam. See sketch below. They did not record whether it had the mastersign of the orb on it.

Essener Auktion IV, no. 81, showed an excellent photograph of the more unusual variation of the steelyard. (Refer to Table 1, no. 4). It had the orb mastersign, like the regular type, but the stuiver units were 6–12–28–35–56–70 and 29–58. Schenk–Behrens called it an 18th century knipwaage. Was this uncommon variation an 18th century type, for weighing later coins? The 56 stuivers was the position for weighing the Double Florijn, a coin that was not minted until 1680, and was produced until 1696. Obviously the coin continued to be used for many years after 1696, but the steelyards with 56 on them could not have been produced before 1680.

Fig. 2. The double–lobed version of beam.

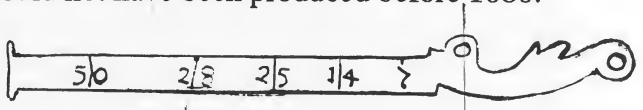


Fig. 3. The single–lobed version.

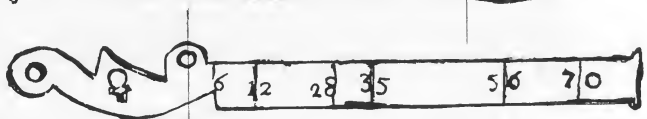
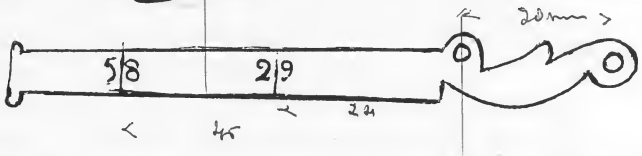


Fig. 3. The reverse of the single–lobed version.

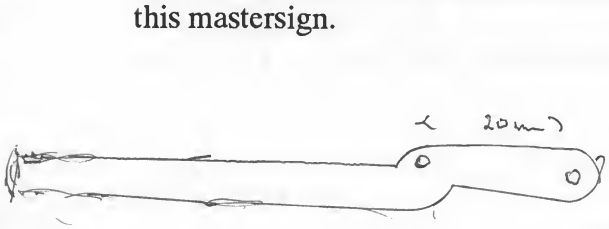


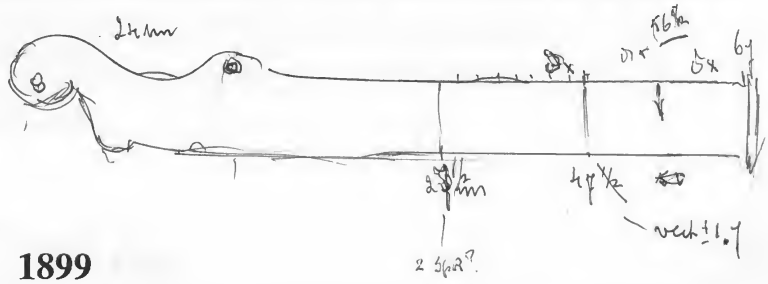
Essener Auktion 6, 1990, no. 41, had another knipwaage to auction, (refer to Table 1, no. 5) mentioned by Jan Bot in his article in *Meten & Wegen*, page 1730. Schenk–Behrens recorded the regular numbers, showed a photograph of the version with the double lobe, as shown in the sketch above, and she recorded that it had the orb mastersign. So the double lobe and the single lobed versions were both made by the same maker.

Houben stated that the orb was the mastersign of the Nuremberg coppersmithing family of Winderschmidt from 1622 onwards. Perhaps he was using Walter Stengel's work. Hermann Lockner, in *Die Merkzeichen der Nürnberger Rotschmiede*, argued that Stengel had no proof that Hans Georg Winterschmid used the mastersign of an orb. Lockner did find evidence that Christoph Winterschmid registered an orb sign in 1667, but not an orb on its own. Christoph Winterschmid used an orb with the cross at the top, and **W** **S** to the sides. 'Our' orb was always upside down, with the cross at the bottom.

Lockner recorded that Christoph Rudolf Winderschmid registered two signs in 1735, a heart pierced by an arrow and also an orb. C R Winderschmid died in 1748. There was no drawing in Lockner's book, to give evidence as to the orientation of the orb, so we cannot be certain that C R Winderschmid's orb was the same as on the steelyards. Also, C R Winderschmid's dates suggest that he was working after the steelyards were made. The only help we get is in knowing that two of the 46 Winderschmids in Nuremberg, had an orb as their mastersign. Both made taps (faucets) as the main part of their business.

Lockner recorded Martin Marggraf [Marckgraff], another tap–maker, as registering an orb with his name as his mastersign in 1679. As with Christoph Winderschmid, he was using the orb with his name (which word seems to cover both the meaning of his whole name or of his initials), at the appropriate time to be the maker of these steelyards, and it was possible that the orb alone was used because there was so little space on the steelyards. Further work needs to be done on this mastersign.





	Illustrated in	Held by	Master sign	Units on front of blade							Units on rear of blade					
1	EQM, page 1877	Pitt-Rivers Mus	Orb	6	12	28	35	56	70		29	58				
2	Kisch, page 63	Oslo	Orb	6	12	24	31	48	60		?					
3	Malter Auc VII, 109	?	?	?												
4	Essener Auc IV, 81	?	Orb	6	12	28	35	56	70		29	58				
5	Essener Auc 6, 41	?	Orb	6	12	24	31	30	48	63	7	14	25	28	50	
6	Noted by R Holtman	Private coll.	Orb	6	12	24	31	30	48	65	7	14	25	28	50	
7	Noted by R Holtman	Private coll.	Orb	6	12	24	31	30	48	65	7	14	25	28	50	
8	Noted by R Holtman	Private coll.	Orb	6	12	24	31	30	48	65	7	14	25	28	50	
9	Noted by R Holtman	Private coll.	Orb	6	12	24	31	30	48	65	7	14	25	28	50	
10	Noted by R Holtman	Private coll.	Orb	6	12	24	31	30	48	63	7	14	25	28	50	
11	Noted by R Holtman	Private coll.		6	12	24	31	30	48	60	7	14	25	28	50	63
12	EQM, page 1897	MAC	Orb	6	12	28	35	56	70		29	58				
13	Wittop Koning & Houben, page 155	?	?	?							7	14	25	28	?	
14	Noted by G Batz	?	?	6	12	24	31	30	48	63	7	14	25	28	50	

1900

Table 2. All the Netherlands' steelyards of the same design that could be found in the literature.

1_____Because the Double Florijn of 56 stuivers was included, this knipwaage was made after 1680.

2_____The knipwaage held in Oslo is illustrated in at least two places, Houben's article in Meten & Wegen, page 604 and Kisch's "Scales & Weights" with an excellent illustration showing the line under the 31 very clearly. This line denoted "and a half".

3_____This knipwaage was not clearly photographed by Malter, and the text gave no details of the mastersign or of the numbers. A neat case was shown at the rear of the photograph.

4_____Because the Double Florijn of 56 stuivers was included, this knipwaage was made after 1680.

10____This knipwaage had the date, 16....68, stamped each side of the mastersign. It had a case. The clip was 61 mm. long.

11____This knipwaage had no orb on it. It had no number 30 punched on it, but there was a deep notch at that position. It had a papier maché box, decorated with book-binders' stamps, and with illegible writing on it. The clip was 56 mm. long.

12____Because the Double Florijn of 56 stuivers was included, it was made after 1680. The clip was 60 mm. long.

14____This knipwaage was recorded as "1680, with the clip missing".

We are left with some problems. What coin was worth 70 stuivers, and its half worth 35 stuivers? I leave the solution of this mystery to the coin scale and coin weight collectors.

Bibliography

✓ Batz, G, of Willowdale, Ontario, private letter to Ben Hilgersom in Amsterdam, 1 July 1985.
Borssum Buisman, G A van, in *Jaarboek Munt- en Penningkunde 40*, 1953, p. 111-135.
Bot, J, Bijzondere aanwinsten voor de Oudheidskamer, in *Meten & Wegen, no. 74,* June 1991, p. 1730.
Enno van Gelder, H, *De Nederlandse Munten,* Aula, no. 213, 1970.
Houben, G M M, De Knipwaage, in *Meten & Wegen 27*, 1979, p. 604.
Houben, G M M, in *Jaarboek Munt- en Penningkunde 62,* 1975, p. 115-121 and 209-212.
Houben, G M M, *The Weighing of Money,* Zwolle, published by the author, 1982, p. 55.
Kisch, B, *Scales and Weights,* New Haven & London, Yale University Press, 1965, Fig. 27 & p. 65.
Lockner, H P, *Die Merkzeichen der Nürnberger Rotschmiede*, München, Deutscher Kunstverlag, 1981.
Malter, J L, *Auction VII,* 22 April 1979, no. 109.
Schenk-Behrens, K W, *Essener Waagen-auktion IV*, 4 Dez 1985, p. 25 & tafel 25.
Schenk-Behrens, K W, *Waagen Auktion Essen 6*, 23 Mai 1990, p. 9 & tafel 5.
Shaw, W A, *The History of Currency 1252-1894,* Wilson & Milne, 1895.
Stengel, W, Die Merkzeichen der Nürnberger Rotschmiede, in *Mitteilungen aus dem Germanischen Nationalmuseum, 1918/19.*
Wittop Koning, D A, & Houben, G M M, *2000 Jaar Gewichten in de Nederlanden*, Uitgeversmaatschappij De Tijdstroom bv Lochem, 1980, p. 155.

Editor- thanks to Ritzo Holtman for pulling together all these strands of evidence. ISASC needs more papers on unusual aspects of metrology, to prevent errors like mine on page 1879. All ISASC members now know, without any doubts, that these knipwaages are Netherlands steelyards.

Contemporary Comment, 1652

Experience has taught me that when the State does not keep extraordinary watch, & the laws are not put into execution against culling & sorting out the heaviest coins to be transported, & the light & clipped left behind, it is a great debasing of the current value of coin. All your [English] silver money is thus abused by goldsmiths & others. When the State does not employ such as can discover those offenders, but puts persons into the Mint who have had no experience, great damage must follow. For there are bankers & exchangers in Holland who know the ignorance of all your present Mint men that have any place of trust, & laugh at them. They say when the Mint in the Tower flourished, ...subtle Mint men were there who held correspondence here [in Amsterdam] & knew what to do to advance the Mint, & would always find a way to bring grist to the mill. But now your Mint comes to be neglected & money adulterated. Many of our bankers here have a great trade with your goldsmiths & merchants in London for English gold & heavy English silver. Your Mint will never go [be successful] until this be discovered, for these men are the sluices that drain all your money. I believe there is, at this day, 40 times more gold & silver in the Low Countries than in England. About 12 years since the French were forced to call in all their money, it being so clipped that their commerce ran into confusion, & you have almost brought yourselves to the same point, the coin in Ireland being 20% less in value since the war. In England almost all your gold is transported, & the little that is left is in hucksters' hands, that go to an exchange in Lombard Street, & you must pay from £6 to £10, & sometimes more, to have £100 in gold for silver. For those who will take gold to the Tower to be coined, & lose 2s. in 20s. of what can they make by transporting it? We have more English gold in Amsterdam than you have, all sent within those 20 years, & great quantities of English silver have weekly come over in pinks [a small trading ship with massively bulging sides] & Dutch men-of-war for years, to the value of many hundred thousand pounds, in return for coin. I wondered at first how the merchants transported all the weighty & culled money into Holland, until one of the bankers told me. I would have you inquire [into] it & prevent it, for it is a most pernicious thing. It is the goldsmiths, especially those in Lombard St, which are the greatest merchants, & London cashiers, & who will receive any man's money for nothing, & pay them for it the same or next day, & meantime keep people in their upper rooms to cull & weigh all they receive, & melt down the weighty, & transport it to foreign parts, sometimes without melting, & keep banks for all the principal coin in Christendom in their shops.

A letter from a friend of Sir Robert Stone, in May 1652, sent from Amsterdam. Quoted in Shaw's *History of Currency.*

More Flexure Springs Part 1 By D Crawforth-Hitchins

The flexure springs discussed in EQM, pages 1861 to 1876 and 1882 to 1888 were, in the main, the earlier designs. The following ones, in the main, were the later designs. Again, they were made in France, USA and the UK, while Germany continued to supply Europe and the USA with mancurs by the thousand.

The C spring scale shown in Fig. 1 bore the trade mark of a fish and DRGM and DRP. I cannot give a first date for the Deutches Reichs Gebrauchsmuster system, but it was probably during the early 19th century. The units were "lbs.", used in Germany for pfunds, the units of weight used until the public accepted the metric system. This C spring pre-dates the metric system, but for many years German scales showed pfunds and loths as well as kilos.

The earliest documentary evidence of this miscellaneous group is Jean Samuel Pauly's British patent no. 4059, of 15th Aug., 1816. See Fig. 2. Judging by the form of his name, he was a Frenchman, but he lived in Britain, at Queen Street, Brompton, Middlesex, (which is now an inner suburb of London,) and he worked as an engineer. As his machine was graduated in pounds avoirdupois Pauly obviously intended to market it in Britain. The abridged patent stated *"A machine for ascertaining in an improved manner the weight of any article. The machine consists of an iron or metallic box or frame, nearly in a square form, containing the springs and machinery herein-after mentioned, and of a brass or iron dial and steel hand on the face of the box. The machine is to be suspended by an iron ring and handle, fastened for that purpose in the middle of the upper end of the box. The dial is screwed to the front of the box, and is graduated with figures and marks denoting pounds and fractions of pounds avoirdupois. The box contains two strong side steel springs, fastened to the bottom and to the inner sides of the box by two screws, but unfixed at the upper ends, and a flexible steel cross spring....."* No example has been seen.

Augustus Siebe's elliptical spring balances came next, as patent no. 4358, in 1819, (see EQM, page 1887) and were presumably in direct competition with Pauly's design. In an advertisement of 1830 Siebe stated that he was *"Sole inventor of the Dial Scales Commonly called Marriott's Patent Dial Weighing Machines."* Was he regretting that he had passed his patent to Marriott, because Marriott was

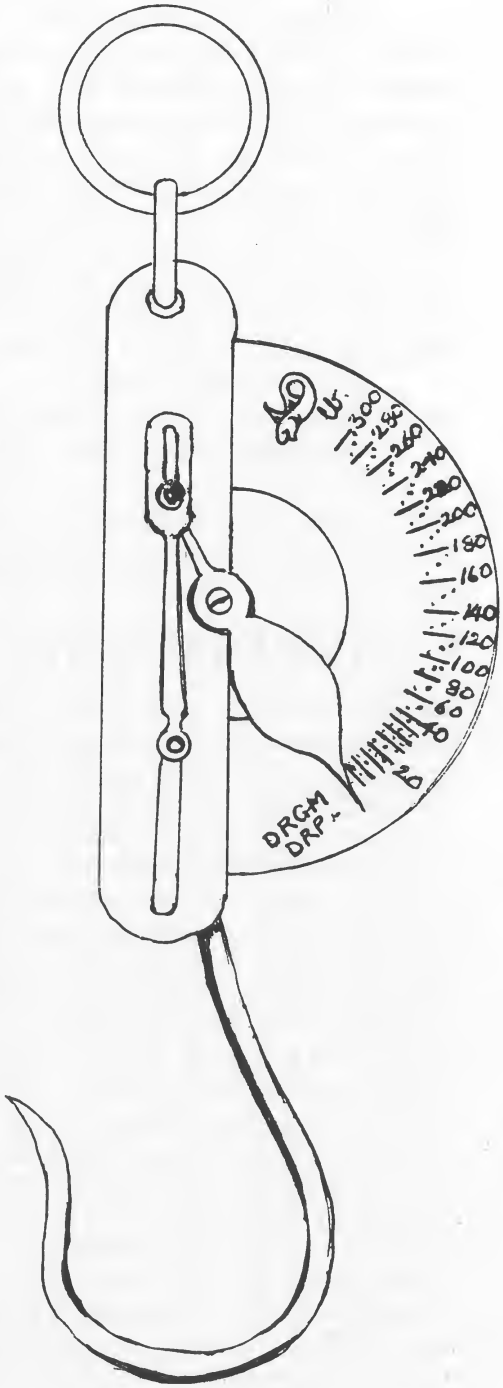


Fig. 1. Made by the maker with the fish/ dolphin trademark. Note the slide attached to the load hook at the bottom & to the back of the pointer at the top.

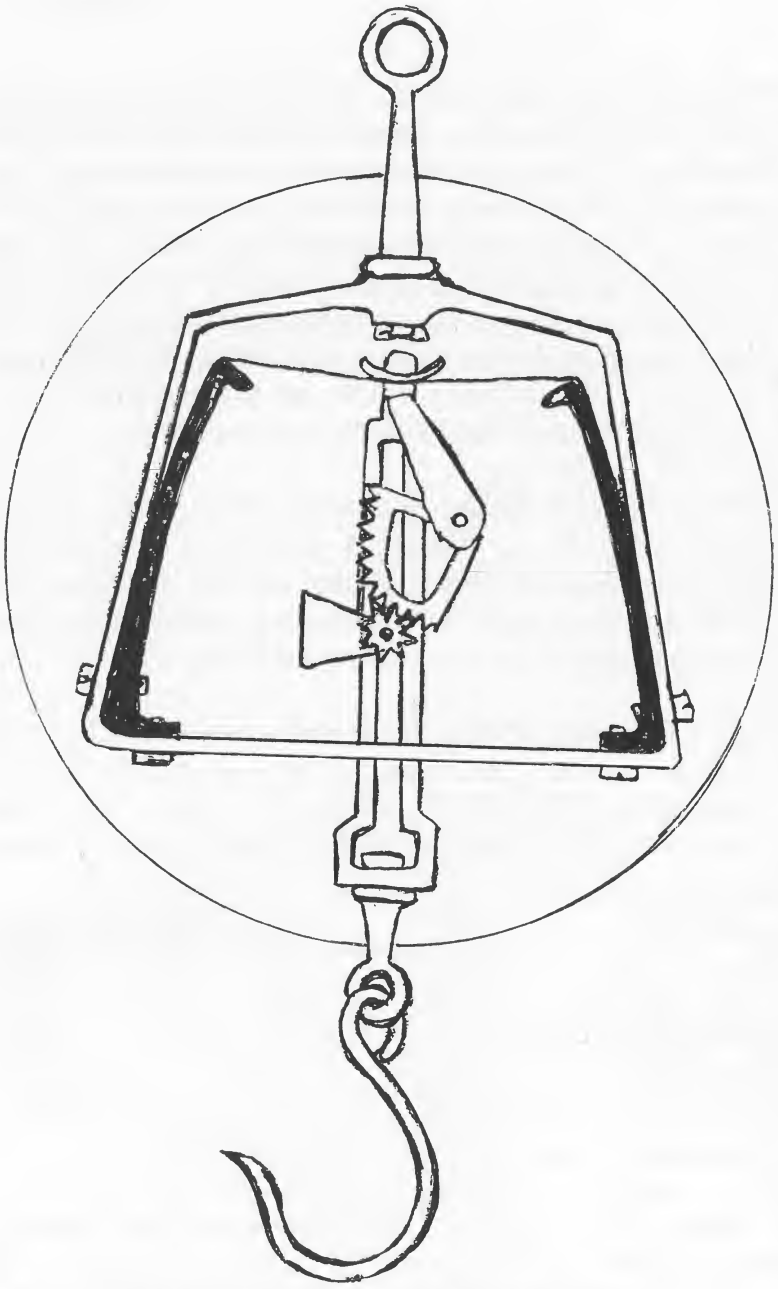
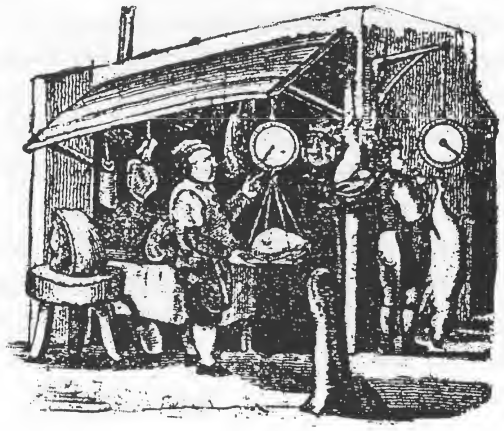


Fig. 2. Pauly's patent of 15th August 1816, no. 4059.

making a good living from making them? Marriott had an excellent advertisement (printed before Queen Victoria came to the throne in 1836,) stating, *"For Accuracy, Simplicity, and Portability, stands unrivalled; it INSTANTANEOUSLY shews the exact Weight of any Article on a Dial without the use of Weights, thereby saving time and labour. Being perfectly portable, it may be used in any situation, its universal utility must therefore be undeniable for Domestic Purposes; in Shops, Warehouses, Coach Offices; Market, Houses, Barns; on Wharfs; at Races and Fairs; for Cattle, Corn Hay, &c....For loading heavy Articles, it may be attached to the Crane, and show the Weight whilst Craning; they are also made with a Chair to weigh Persons. From its extreme simplicity, it is scarcely possible to be inaccurate; yet, if ever it should be so, there is an adjusting screw, which will momentarily correct it. They are made in various sizes, to weigh from one ounce to one Ton, and to all Foreign Weight if required, can be made to any specified Plan. Manufactory, London House, No. 89, Fleet Street. N. B. Several spurious imitations of this useful Invention being offered for sale, H Marriott cautions the Public against them; none are upon his genuine Improved Patent principle which have not his Name over the King's Arms which is upon them all."* No wonder Marriott was commercially successful. See one of the little cameos decorating the advertisement on the right, Fig. 3.



Thomas Braby's spring balance was probably invented between about 1820 and 1835, but no documentary evidence has been found. His unusual trade scales are dealt with separately on page 1911.

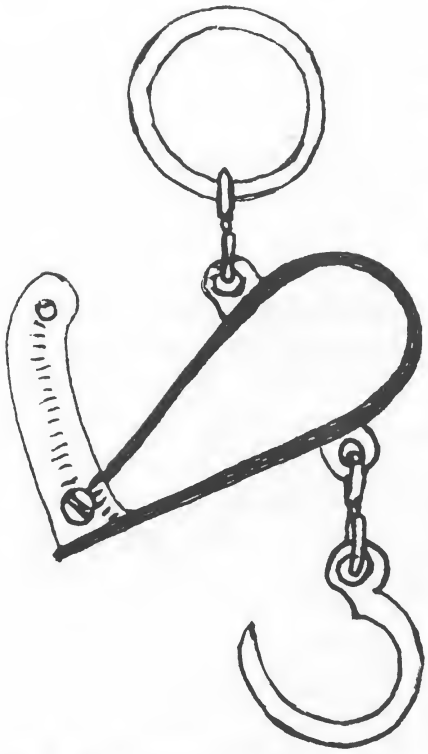


Fig. 4. Anonymous, in kilos.

The tear-drop shaped spring used by Braby was used by another unknown maker, possibly at about the same period. See Fig. 4. The country of origin is unknown, but it was probably made in France or Germany, as it was calibrated in Kilos. The design was more compact than Braby's, and used a spring manufactured in a much better way, Braby using coach springs, whereas this anonymous maker was using the same springs as mancur makers were using. The Braby was 19 inches (470 mm.) long, but the anonymous one was only 7 inches (170 mm.) long, with the same capacity!

In Paris, Narcissé Briais was toying with the idea of a flexure spring postal balance. See Fig. 5. He put one into his French patent drawings no. 28419, granted on 28th October, 1856. None have been seen, not surprisingly, taking into account the complexity of the manufacturing process.

Oscar C Squyer of New York had a much simpler, more elegant solution. His delightful oval spring balance was patented on 8th May, 1860. To quote his patent, *"COMPENSATING SPRING-BALANCE, specification of Letters Patent no. 28,212, dated May 8, 1860. To all whom it may concern: Be it known that I, OSCAR C SQUYER, of West Dresden, in the county of Yates and State of New York, have invented a new and Improved Compensating Spring Balance or Scale for Weighing Various Articles: and I do hereby declare that the following is a full and exact description thereof, reference being had to the accompanying drawings and the letters of reference marked thereon. / Figure 1 is the perspective view of the balance. Fig. 2 a sectional view, and Fig. 3 is also a sectional view showing the scale as used in two directions for compensating. / The same letters have reference to similar parts in all the figures. / To enable others skilled in the art to make and use my invention, I will proceed to describe its construction and operation. / A is an endless ring of metal made in the form of a circle or oval, (bearing suitable spring temper,) to which one end of the graduated arm **B** is rigidly secured while the other end of it passes freely through the slot **a**, in A. This arm or bar **B** is graduated from zero (0) either way with 1, ½, ¼, 1/8, or 1/16 pound*

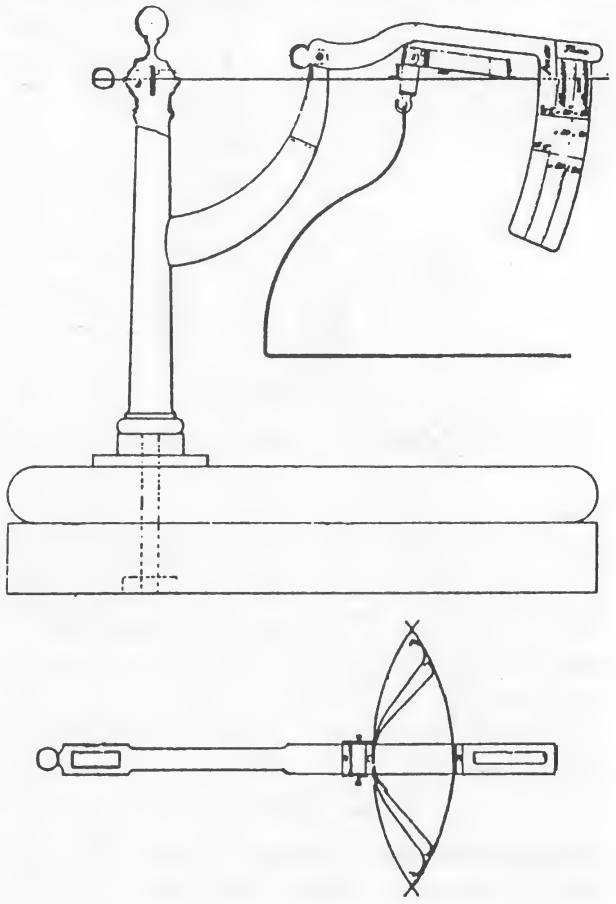


Fig. 5. Briais' patent of 28th October 1856.

*graduations marked thereon. The swivel hook **C** is attached upon the side of **A** as also is that of **C1**. The rings **D** and **D1** are attached upon the opposite sides of **A**. The various forms of making the endless ring **A** constitutes quite an important consideration in their construction, as the form of a perfect circle would make the graduations of the bar **B** equal on the two sides **b** and **b1** from zero, and it would take the same weight attached to the hook **C** to indicate a certain number of graduations on **b** that it would take if applied to the hook **C1** to indicate a like number of graduations on **b**. But when the form assumes an oval shape, then the force or weight as applied to the hooks **C** and **C1** changes the longer and narrower the oval is, the greater will be the*

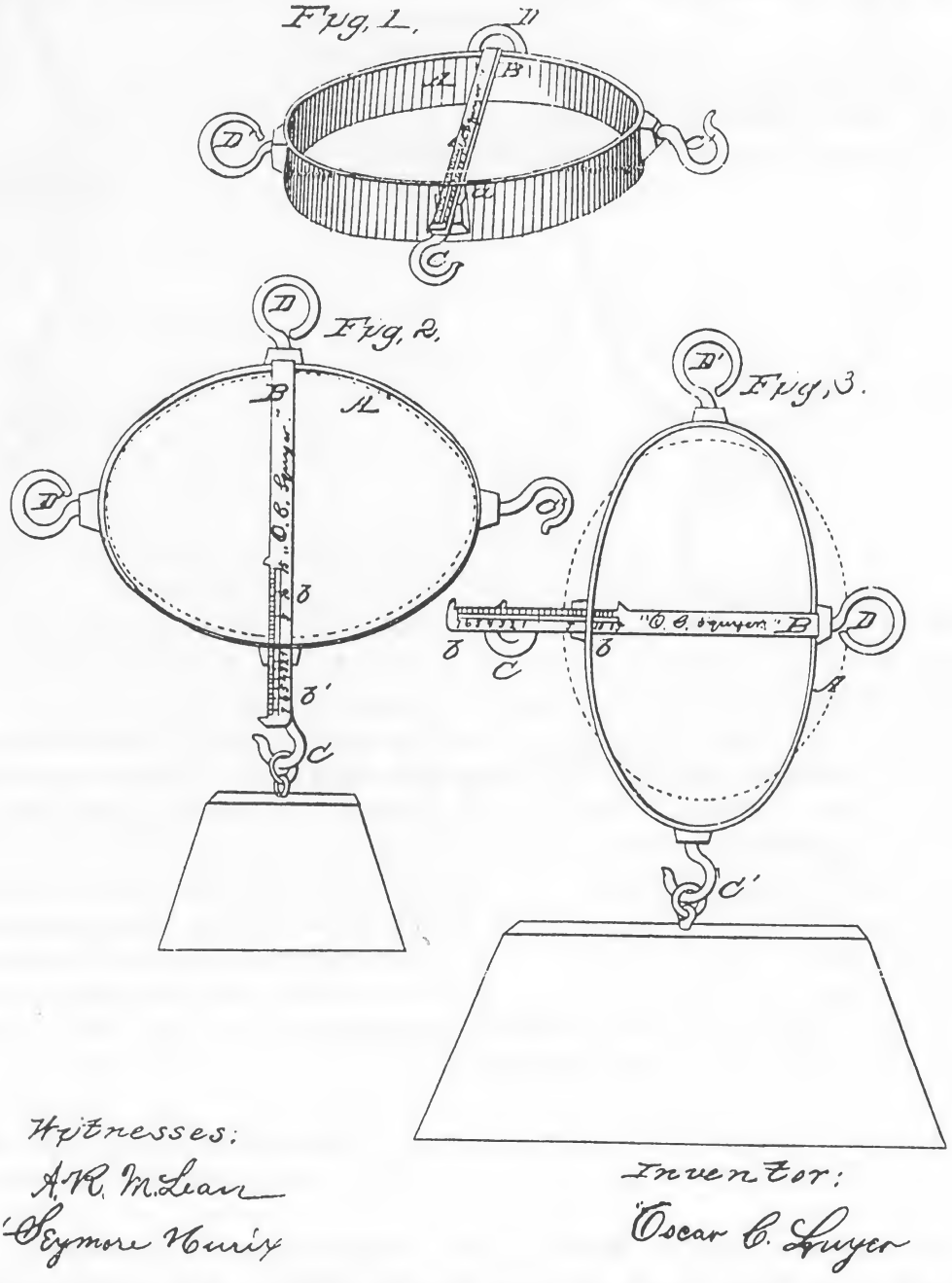


Fig. 6. The patent drawings for O C Squyer's spring scale, of 8th May, 1860. Compare the drawings above with the sketch of the actual scale in Fig. 7. Note the differences. The manufactured scale is very elegant. Only one example known.

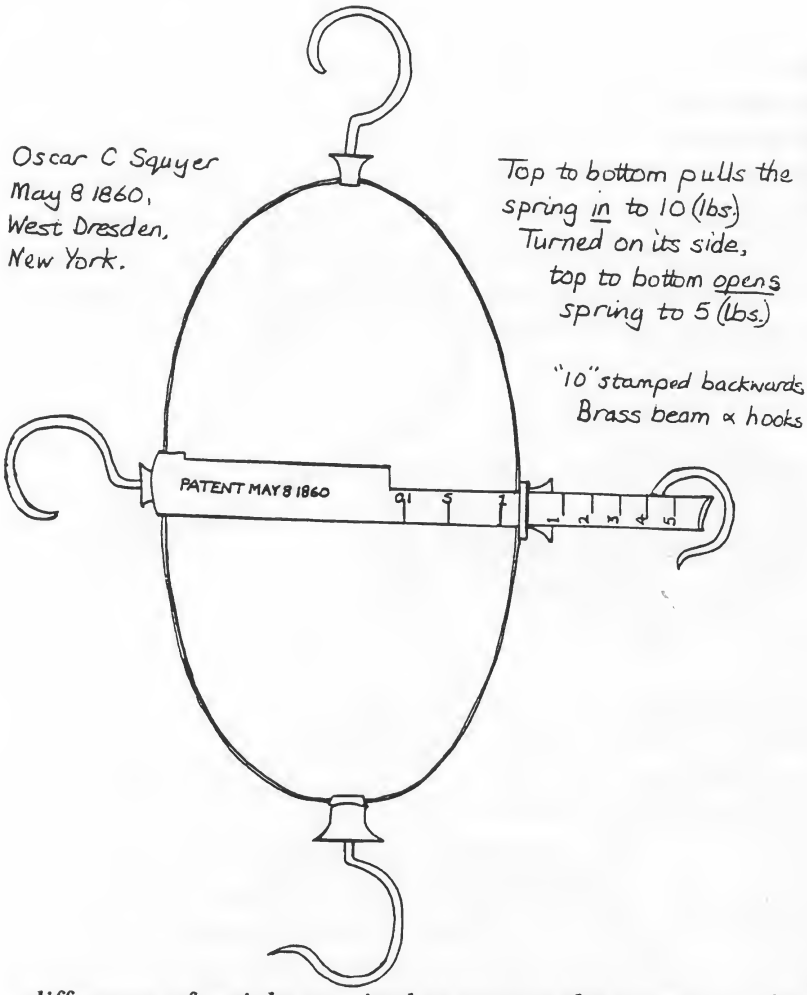
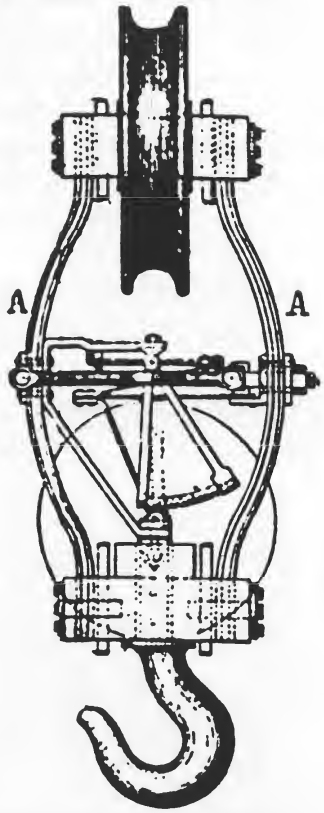


Fig. 7. Sketch of the Squyer spring scale. Compare with the patent drawings.

Fig. 8. Jasper & Taurine's crane weigher.



difference of weight required to actuate the spring– as for instance by elongating the oval, the weight of one ounce would move the bar ***B*** *one degree on* ***b1*** *if applied to the hook* ***C*** *while it would take one pound to move to one degree on the side* ***b*** *if applied to the hook* ***C.*** */ The dotted lines in Figs 2 and 3 show the balance or scale when at rest while the full lines indicate the position as it would be with the weights attached as shown. / It is compensating by being susceptible of use or strain from* ***D*** *to* ***C*** *or from* ***D1*** *to* ***C1.*** *By this arrangement, if the ring* ***A*** *loose strength in the direction from* ***D*** *to* ***C,*** *by using it in the direction from* ***D1*** *to* ***C1*** *it will compensate or help to regain its original power. / It is unnecessary to direct here, how to use my invention, as the drawings (which form a part of these specifications) and the foregoing descriptions fully show its application. / What I claim as my invention and desire to secure by Letters Patent, is / The metallic spring endless ring* ***A*** *in a circular or oval form, with the graduated arms or bar* ***B,*** *hooks* ***C*** *and* ***C1,*** *and rings* ***D*** *and* ***D1,*** *constructed and operated as substantially set forth. OSCAR C SQUYER. Witnesses A R MCLEAN and SEYMOUR HURD."*

Edina Marie Michalet and Henry Gervais Dupas of Paris had an idea in 1862 that was more practical than Briais' idea of six years earlier. See Fig. 9. No example has been recorded.

Jaspar & Taurines of Liège in Belgium made a crane weigher, shown in Fig. 8, which was described by Dr. E Brauer in *The Construction of the Balance* written in 1880. A pair of leaf springs were flattened by the load. The motion was not proportional to the load, as the moment of flexure which operated on the springs was diminished by progressive stretching. In order to obtain a graduation of a nearly equal form, Taurines applied a peculiar mechanism, consisting of

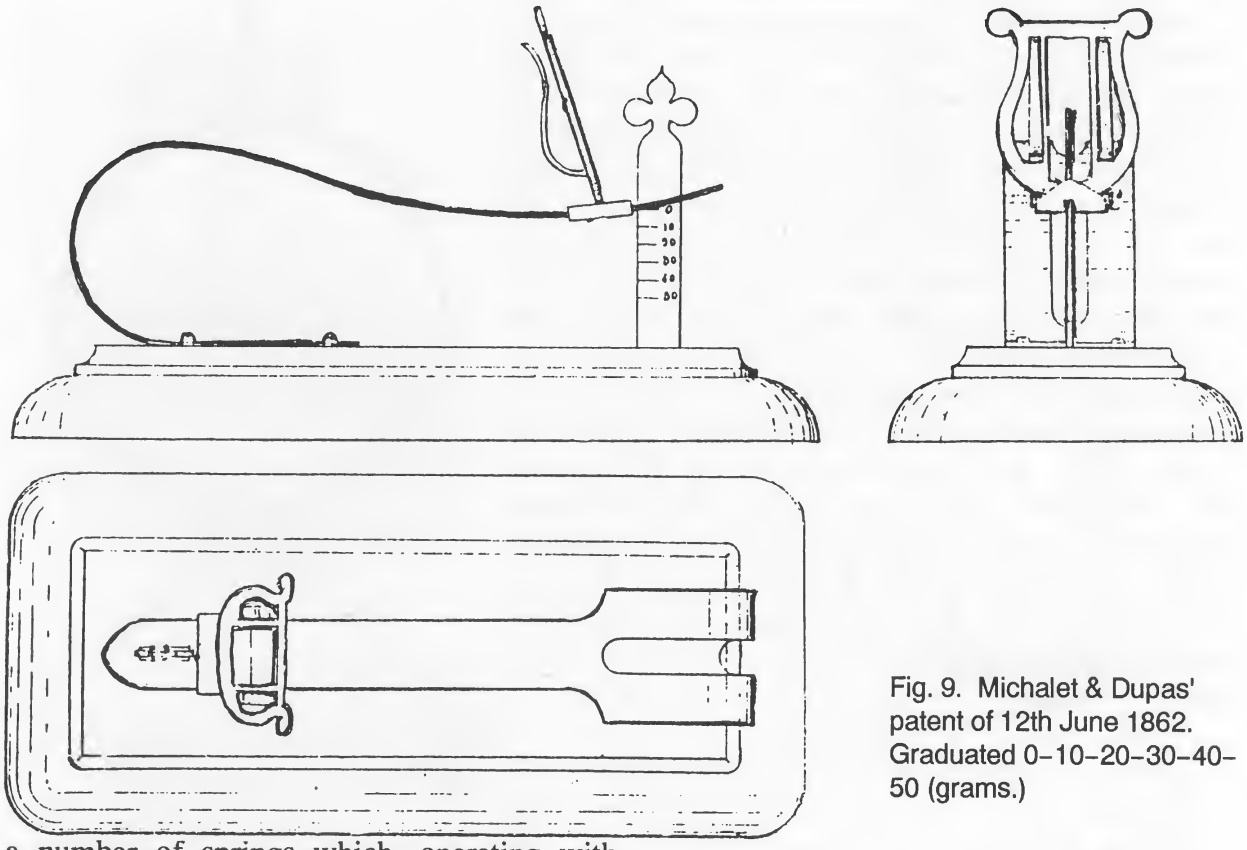


Fig. 9. Michalet & Dupas' patent of 12th June 1862. Graduated 0–10–20–30–40–50 (grams.)

a number of springs which, operating with opposite inequality, carried over, by means of a sector gear and pinion, the flexure of the leaf–springs to a rotating indicator.

EW's (or was it WE's?) delightful little parcel scale, Fig. 10, was made between 1883 and 1886, when those postage rates were current. Because the spring was eccentric, the pointer slid down the slot without rubbing on the sides, a feature much admired by Michael Crawforth. The brass face was pressed, not cast. It was 5½ inches (140 mm.) long overall.

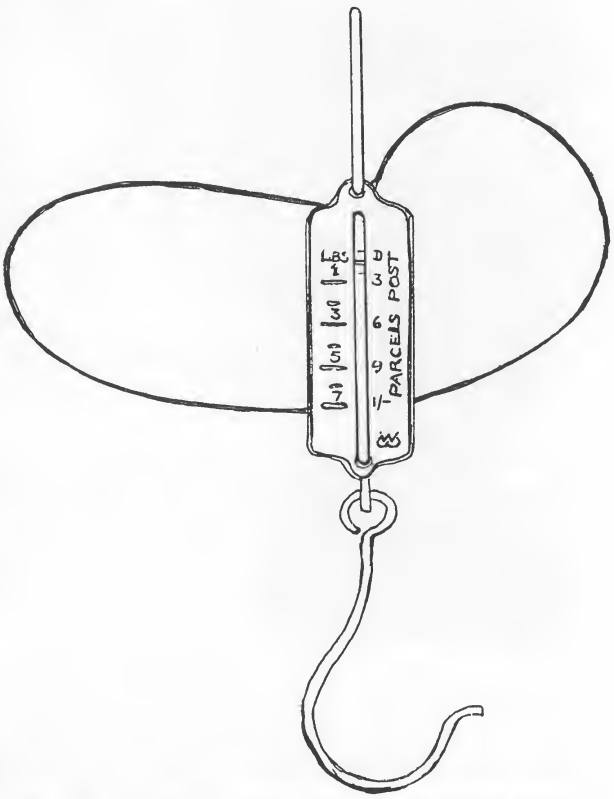


Fig. 10. Trademark of an E and W. 1883–1886.

Emil Ubrig of Berlin had a flush of ideas, briefly mentioned in the abridged specifications, of his British Patent no. 6586, of 30th May 1885. See Fig. 11. *"Spring apparatus:– Springs are substituted for the pivoted rods ordinarily used to keep the scale–supporting frame vertical, which springs may assist or perform the weighing. In the arrangement shown, the springs are fixed to the casing at the right side, and may be used*

either free for light weights or be clamped at the top left for heavier weights. In some cases the spiral portion is dispensed with, as seen at the right-hand side of the figure. The flat springs are used with or without helical weighing springs. In a modification, the lower spring is turned round to form an elliptical weighing-spring, and in another arrangement both springs are secured to the frame at one end only." Ubrig made a great variety of top-pan spring balances, and it is difficult to identify those that used any of the ideas above. Perhaps an external clue to the heavy capacity flexure springs was the butterfly nut shown at 10.00 o'clock on the dial. Another clue was a circular flat back about 1½ inches or 35 mm. deep. See the cover picture. As the "pivoted rods" mentioned above were a half roberval linkage possibly there was a protruding "nose" at the back, into which the top linkage was fixed. See Fig. 12. Alternatively, if the back was shaped like half a tube attached vertically down the back, it contained helical springs. See Fig. 13.

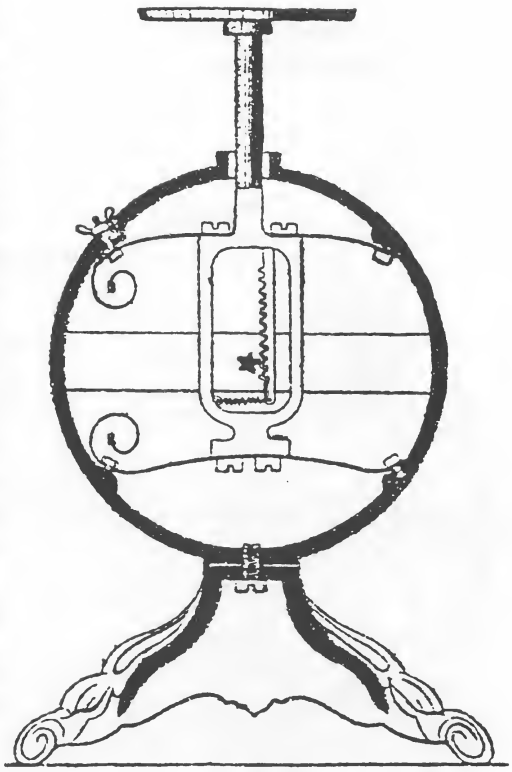
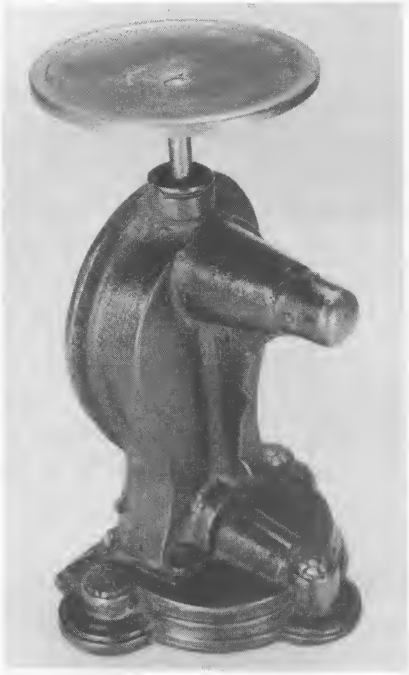


Fig. 11. Ubrig's UK patent, 30 May 1885, no. 6586. Never seen.

The Cover photograph and Fig. 14, shows Emil Ubrig's Union scale, which I hesitantly suggest might be *"both springs are secured to the frame at one end only."* Of



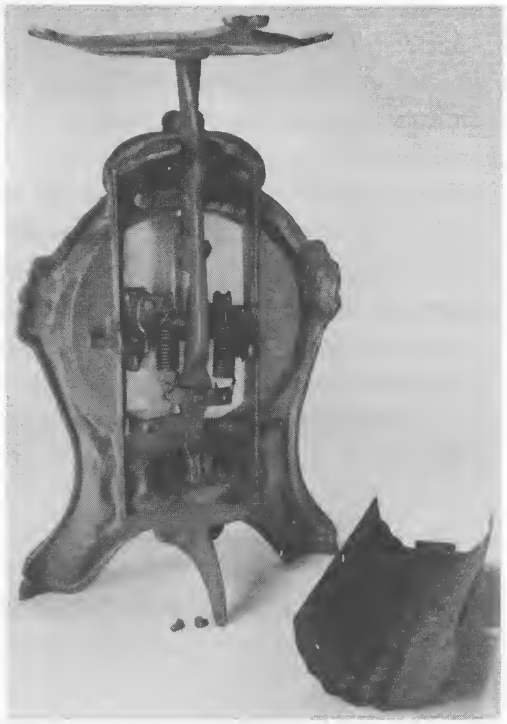


Fig. 12. The rear of a Salter top-pan spring balance, showing the 'nose' protruding at the back, into which the roberval linkage fitted.
Fig. 13. The rear of another Salter top-pan spring scale, but with the Continental design of flat, laterally placed roberval linkage. Both shapes of back imply a half-roberval linkage, without the need to remove the back to find out.

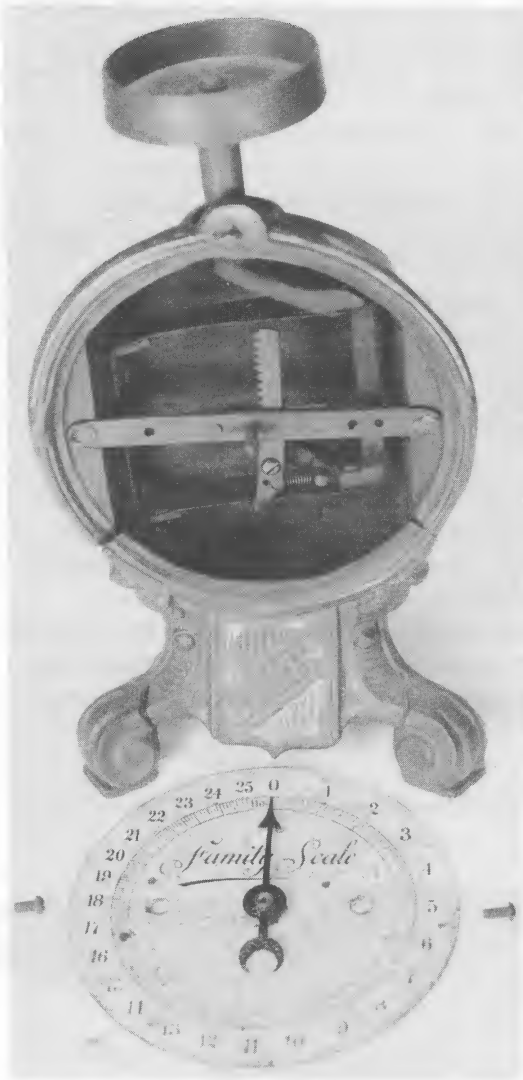


Fig. 14. The innards of the scale on the front cover. The pan has been removed.

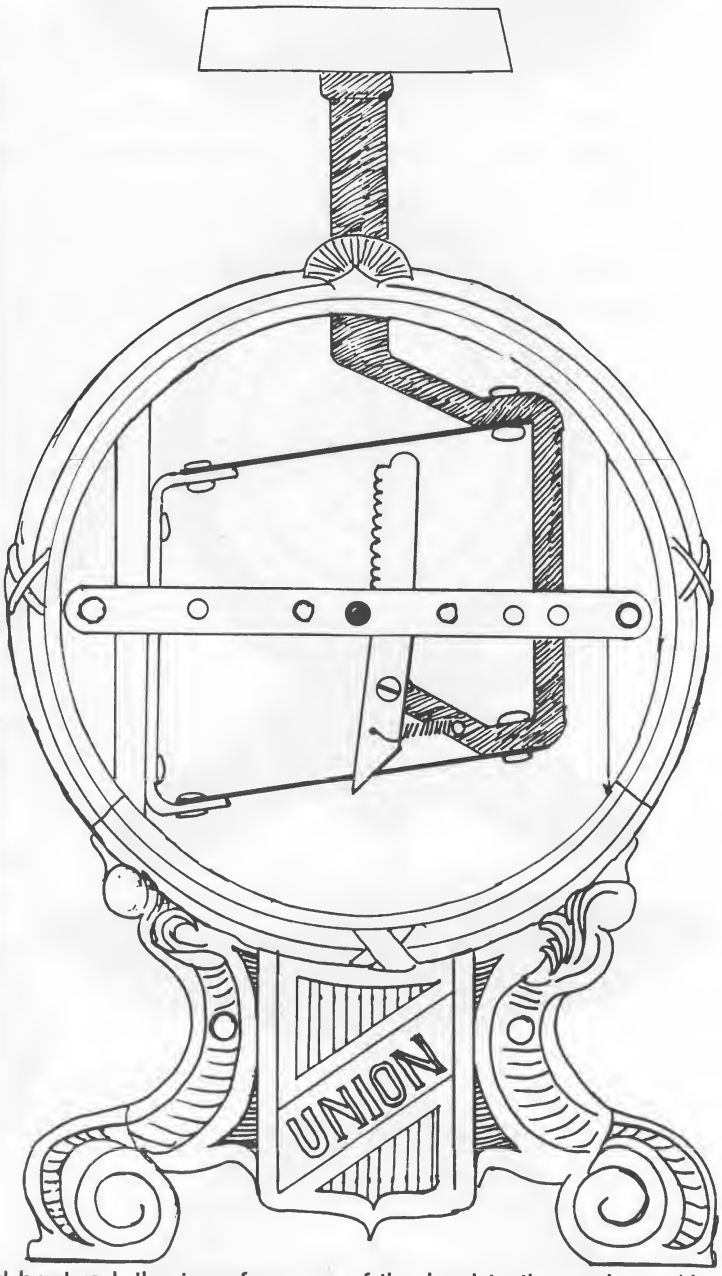


Fig. 15. Diagram showing, as a shaded and bent rod, the transferrence of the load to the springs, (the springs are at a slight diagonal, being a parallel pair of strips).

course they *were* secured to the frame, but in a symmetrical design, whereas the key feature of the Union was that the design was asymmetrical, with the rigid bent rod (shaded in grey,) going from the pan, down inside the circular box, off to the right, down the side, back to the left and up at an angle to join the ratchet. This heavy iron casting was prevented from twisting or shifting by the flat springs. The springs were 3 inches (80 mm.) long and $^{6}/_{10}$ inches wide (14 mm.) and held by two rivets to the frame on the left and by two rivets to the rod on the right. This design was practical and cheap to make.

Flat springs were still being offered in Ubrig's catalogue of 1892, where he offered two designs with 2 helical springs, nine designs with one helical spring (more cheaply) and five designs with flat springs, (most cheaply.) None of them seem to be valid for trade use. See Figs. 16 to18.

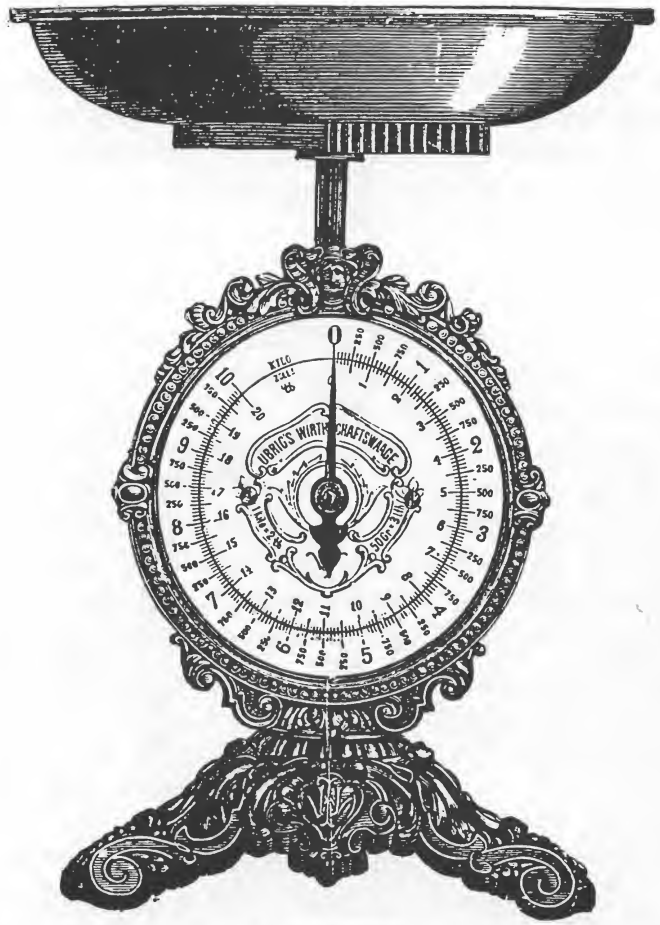
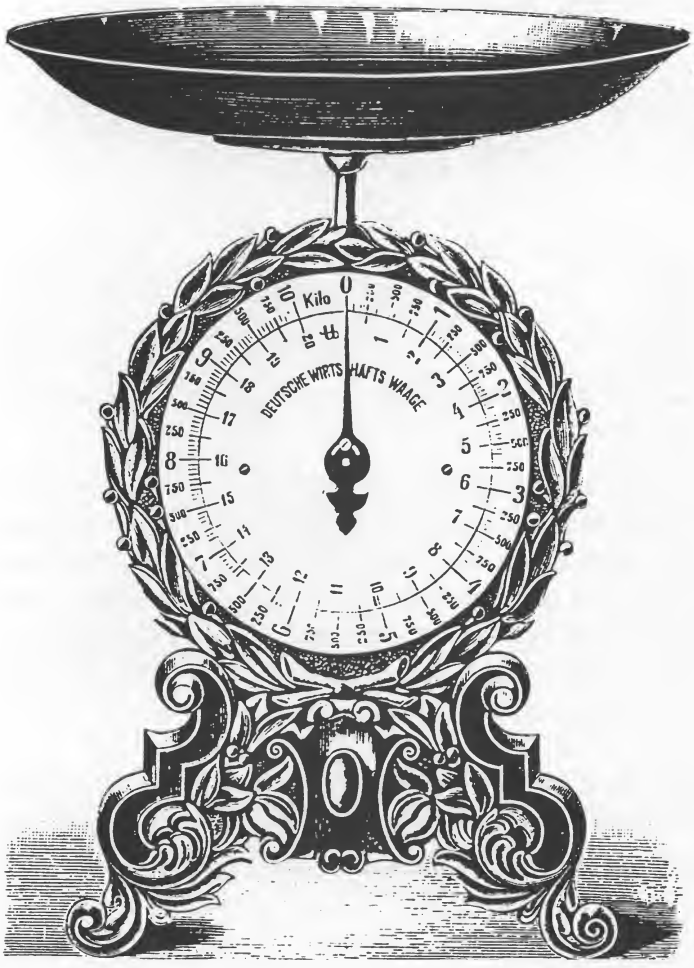


Fig. 16. From the 1892 catalogue of Emil Ubrig & Co. Wirthschaftswaage No. 7. Household scale. Divisions by 50 grams. Flat springs. Price for 10 kilo capacity with enamelled face, 4.10 marks.

Fig. 17. Below left. Also from the 1892 catalogue. Wirthschaftswaage No. 14, (früher Fetter's No. 4.) Household scale no. 14, previously Fetter's no. 4. Flat spring. Price for 10 kilo capacity with enamelled face, 4.30 marks. Please will any reader who can identify Fetter write to the editor.

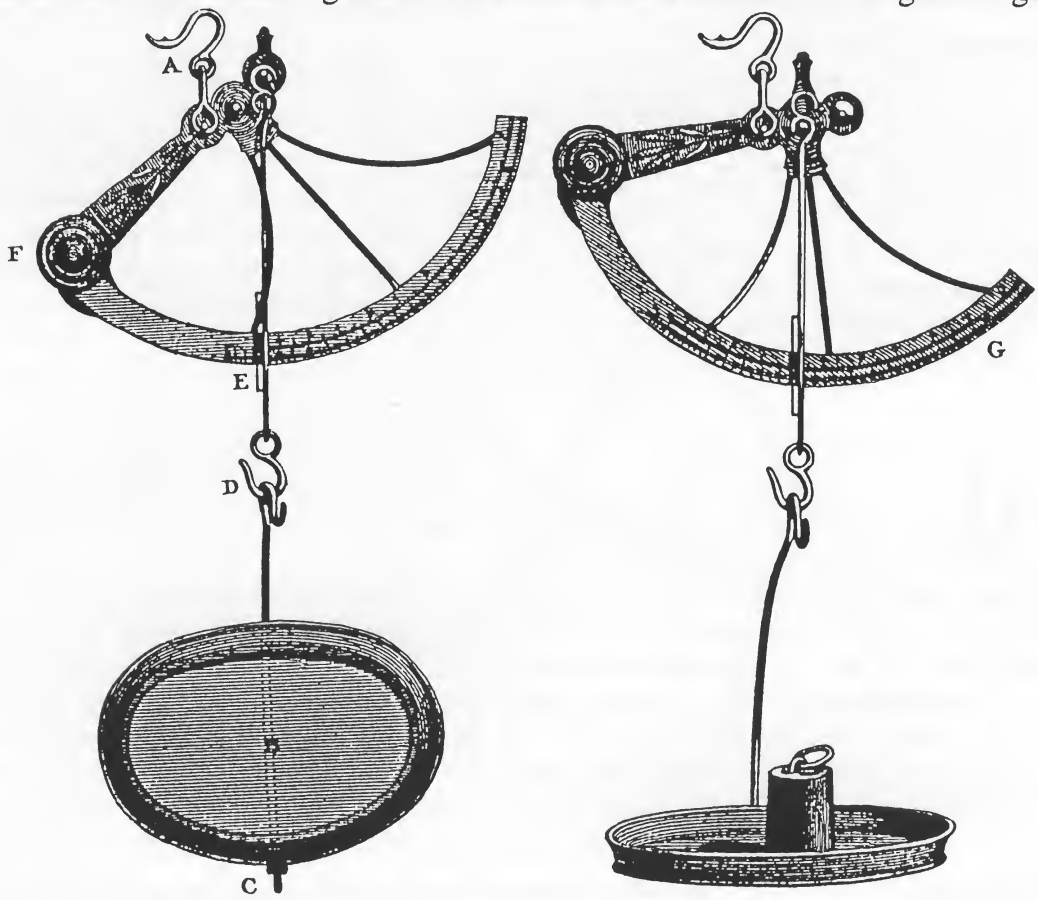
Fig. 18. Below right. Another from the 1892 catalogue. Wirthschaftswaage No. 8. Flat spring. Leichte Sorte, besonders für Export. Household scale. Lightweight version, especially for export. Price for 10 kilo capacity with enamelled face, 3.10 marks. Note that it had divisions in grams and in zolls and loths.

Part 3 of this article in the next EQM.



James & Thomas Braby By D F CRAWFORTH-HITCHINS

In 1815, James Braby was running a business in a little hamlet on Vine Street, off Pedlar's Acre, Lambeth. Even though he was only ½ mile from the Houses of Parliament, he was living on a wiggly country lane, surrounded by market gardens and tenter grounds, (flat clean lawns where cloth was stretched out to dry and bleach in the sun.) Between his house and the River Thames there was timber stacked in yards for one mile along the waterfront. Although there were so few houses, it must have been a bustling area as carts and barrows trundled all the green vegetables



The SILVER MEDAL *was this Session voted to Mr.* JAMES BRABY, *of Pedlar's Acre, Lambeth, for a Weighing Machine for family use. The following Communication was received from him, and the Machine is preserved in the Society's Repository.*

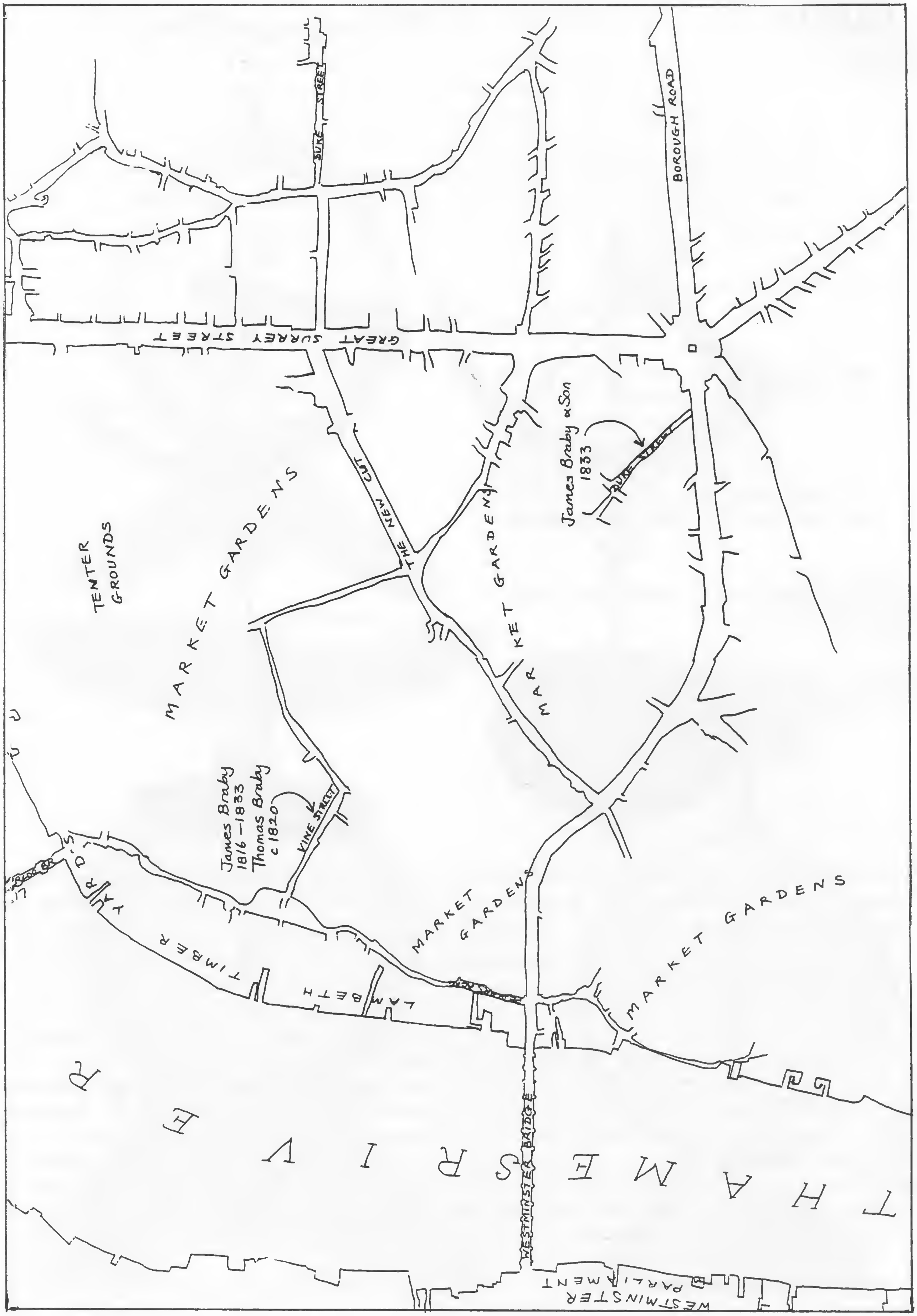
SIR,

I BEG leave to lay before the Society of Arts, &c. a new balance of my invention, with a constant self-acting weight, by which goods of any description may be weighed with accuracy. I call it a domestic balance from its being more particularly adapted for family purposes, such as weighing meat, bread, butter, &c. for which I conceive it will be far preferable to weights and scales, the weights being often lost or misplaced by servants. The common steel-yard is also unhandy for domestic use, as it has no scale to place the goods in, nor will it weigh sufficiently accurate to detect short weight in small articles. I trust this new balance will not be liable to these objections; it can be made to carry any weight and will take up very little room in a kitchen, or any other place, as it hangs flat against the wall when not in use; is not liable to be damaged or put out of repair, and always ready for use without any trouble. I hope the Committee will examine it, and if entitled to reward, it will be gratefully received by, Sir, Your most obedient Servant,

JAMES BRABY.

Vine-street, Pedlar's-Acre, Lambeth, April 11, 1815.

Fig. 1 above. Drawings and letter sent to the Society of Arts. Accompanying explanation in Fig. 3.


BOROUGH ROAD
DUKE STREET
GREAT SURREY STREET
THE NEW CUT
James Braby & Son
1833
DUKE STREET
TENTER GROUNDS
MARKET GARDENS
MARKET GARDENS
James Braby
1816 – 1833
Thomas Braby
c 1820
VINE STREET
TIMBER YARD'S
LAMBETH
MARKET GARDENS
MARKET GARDENS
MARKET GARDENS
WESTMINSTER BRIDGE
THAMES RIVER
WESTMINSTER PARLIAMENT

1912

and perishables down to the ferries or across the new Westminster Bridge into Westminster and London every morning. See the map on page 1912. As a wheelwright and smith, he must have been an essential part of the scene, mending wheelbarrows, making carts, dealing in gardening tools and helping to keep his neighbours operational.

Reference to the Engraving of Mr. Braby's Domestic Balance. to supersede the necessity of Weights, being an improvement upon Steel-yards. See Plate 16, *Figs.* 1 *&* 2.

The fulcrum or point of suspension in this instrument is a lever of the first order.

The weight is fixed at the longer arm of the lever. The balance, or scale for weighing, is to be suspended on one of the two centres situated on the shorter arm of the lever.

The graduated scale of weights is divided upon a segment of a circle, occupying about 140 degrees, the divisions being in two rows, each calculated for and tending to the respective centre upon which the balance and its index is to be suspended.

Fig. 1, represents the domestic balance, which is to be suspended by its hook A, from a pin in the wall, and for the convenience of occupying little room, the scale B is here turned up flat by a joint C; it thus permits articles too large for the scale to be hung upon the hook D, to be weighed.

The balance and index in this figure are placed upon that centre which is most distant from the fulcrum, and is intended for weighing goods under five pounds. The inner row of divisions tending to this centre graduated upon the arch up to No. 5, represent pounds subdivided into halves, quarters, and ounces; the index, which is a thin edge E, on the side of the balance rod in this figure, stands at 0, or Zero, the scale being empty. According to the quantity of goods put into the scale, the weight F, at the longer end of the lever, will rise until it hangs in equilibrio; the index will then shew, by the mark of the graduation, he weight of the goods in the scale.

To weigh any articles exceeding five pounds weight, the balance rod is to be suspended upon that centre or pivot nearest to the fulcrum, as shewn in Fig. 2; the purchase being less, a greater weight may be suspended in equilibrio; in this case the outer row of divisions G, intersected by the index, will shew any weight in the balance very accurately as far as fifteen pounds, the extent for which this instrument was intended. In this figure the scale is let down in the position most favourable for articles to be generally weighed, the weight within it serving merely to shew how the article to be weighed is to be placed.

*** Since the above Apparatus was rewarded by the Society, Mr. Braby has made considerable improvements therein, by which a machine of the same size will weigh double the weight, and accurately shew the divisions of a pound into half-ounces. He has also placed one of the improved machines in the Society's Repository.

Mr. Braby has made several machines upon the same principle, capable of weighing one hundred weight, but the sizes he recommends as most generally useful are those to weigh half a hundred.

Fig. 3. The explanation that James Braby sent to the Society of Arts in 1815.

Did he invent his scales, (Fig. 1) originally to aid his neighbours when they were weighing boxes of strawberries? As the maximum capacity of the scale was 15 lbs., it seems a reasonable supposition. To offer the scales for kitchen use was a logical extension of their function, with the practical "flip–up" pan, which allowed the scales to be stored against the wall.

So how did Braby think of a pendulum scale? They were virtually unknown in England in 1815, the Anscheutz & Schlaff coin scale of 1772 having fallen out of use many years earlier. The scale was basically a steelyard with an arc attached below it, giving it great stability. Because the arc moved behind the load rod, it was easy to read off the graduations against the rod. To us, it seems so obvious, with our familiarity with pendulum scales, (Riddle, Dampier, Testut, Hall,) but in 1815 it must have been very novel to use a scale with instant read–out and no fiddling about with weights.

National Museum of Scotland, Edinburgh, no. 1975.18. Photo by Crawforth

Fig. 4. The renovated pendulum scale, made of iron with two brass arcs. No. 1 pivot had a capacity of 2lb., no. 2 pivot had a capacity of 11lb., and no. 3 pivot had a capacity of 30lb.

George Salter was selling his tubular spring balances in large numbers in 1815, so people would have been familiar with instant read–out on spring balances but not on a pendulum scale. As was discussed in the last EQM, mancurs and their variations were being used extensively on the Continent, with their instant read–out, but there is not evidence for mancurs being used by the ordinary Englishman until the late 19th century.

So James Braby had a very original idea, which he made more unusual by having two load pivots, one nearer the carrying handle for heavier loads up to 15 lbs., (Fig. 1, drawing on the right,) and one further from the carrying handle (Fig. 1, drawing on the left,) for lighter loads up to 5 lbs. Turn–over steelyards had two carrying positions (and consequently, one set of graduations on each side of the beam) but how did James Braby hit on the idea of two load pivots? Had he seen a mancur with two load pivots, and realised that he could modify the idea for his pendulum scale?

James Braby went further and produced the ornate version with three load pivots, (Fig. 4.) On examination, the difference in the spacing of the graduations was not that great between the three sets, as the pivots were so near to each other. The capacity at pivot no. 1 was 2 lbs., pivot no. 2 was 11 lbs. and up to 32 lbs. on pivot no. 3. James Braby accustomed people to two sets of

graduations very close to each other, one to be used with each pivot. As has been pointed out in earlier EQMs, it was extremely easy to use the wrong set of graduations, (as on the Union Platform Scale.)

National Trust, Snowshill Manor, Broadway. Photo by Crawforth

Fig. 5. Braby's flat spring scale. No documentary evidence helps to date this rare scale.

The Society Of Arts referred to his variations with a capacity of 30 lbs., or 56 lbs, the size that *"he recommends as most generally useful."* There was no mechanical reason why his 112 lbs. version should have been any less useful, but perhaps he thought that the graduations were rather close together on the higher capacity scales.

James Braby apparently worked throughout his life in Vine Street, (although Waterloo Station eventually was built over the site of his workshop,) and Thomas Braby, his son, also worked there, but they had another premises about ½ mile away. In 1833 they had a wheelwright and smith's business at Duke Street, Stamford Street. As there were two Duke Streets equidistant from Stamford Street and from Vine Street, both in the built-up area around Borough, it cannot be ascertained which was considered to be nearer Stamford Street. It seems more probable that the south-westerly Duke Street was the place, as that was still very close to market gardens.

The second scale, (stamped **T B** on the brass disc covering the rear end of the pointer,) was a proper flexure spring scale, (Fig. 5) with its smithing ancestry clearly visible. *"Braby, Maker, Vine Street, Lambeth,"* made them. The brass arc was curled round at the bottom to form a stop for the pointer. Two are recorded, one with a capacity of 28 lbs., (Fig. 6,) and one with a capacity of 42 lbs, (Fig. 5.) He had solved the problem of how to link a curved spring to the back of a pointer so that the pointer would be pulled round the arc when the spring was expanded. Of course the mancur makers had solved the problem elegantly at least 70 years earlier, and Thomas Braby might have seen a mancur, but (because of the rarity of mancurs in England) it is possible that Thomas Braby solved the problem independently. No evidence has been found as to when the scale was invented, but perhaps around 1820 to 1830.

James Braby got a patent for the construction of carriages on 11th Jan, 1837, the last documentary evidence available, so we must use our imaginations to envisage James and Thomas sweating over their forge for most of the 19th century.

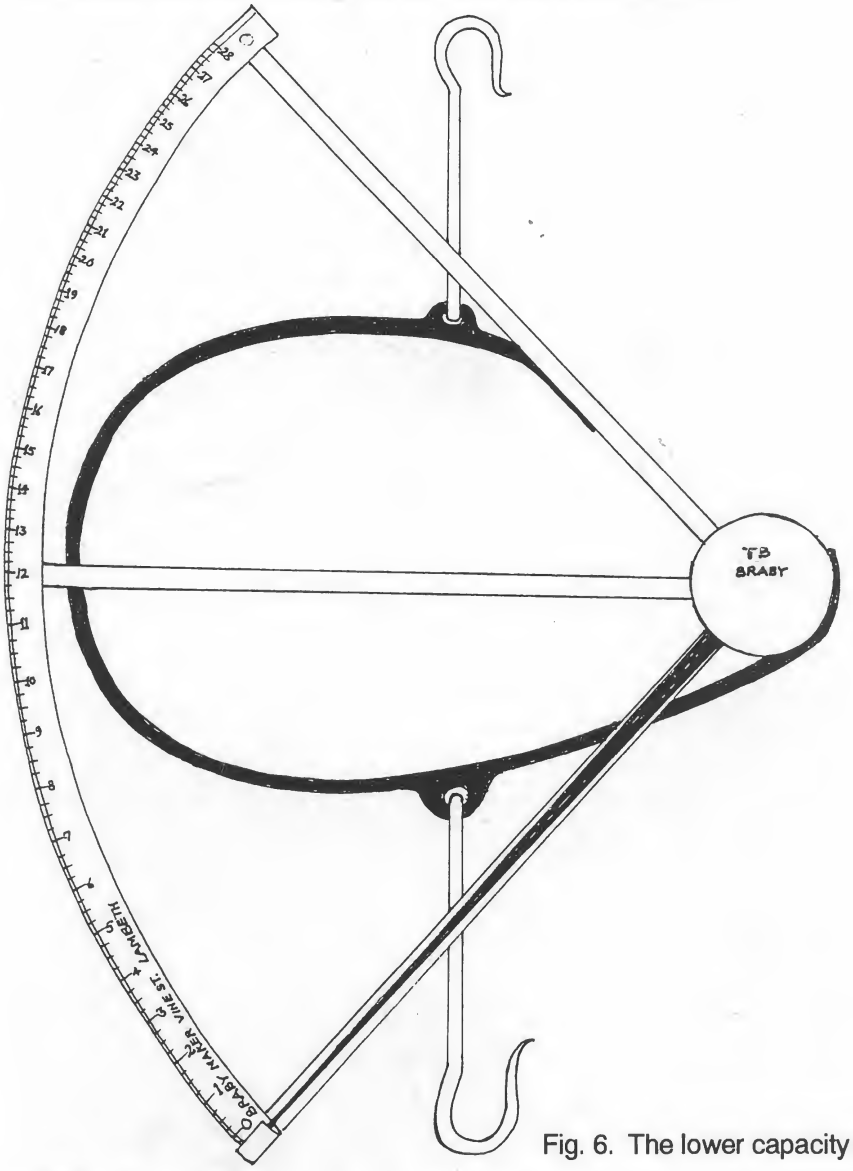


Fig. 6. The lower capacity spring scale made by Thomas Braby.

Coin Weight

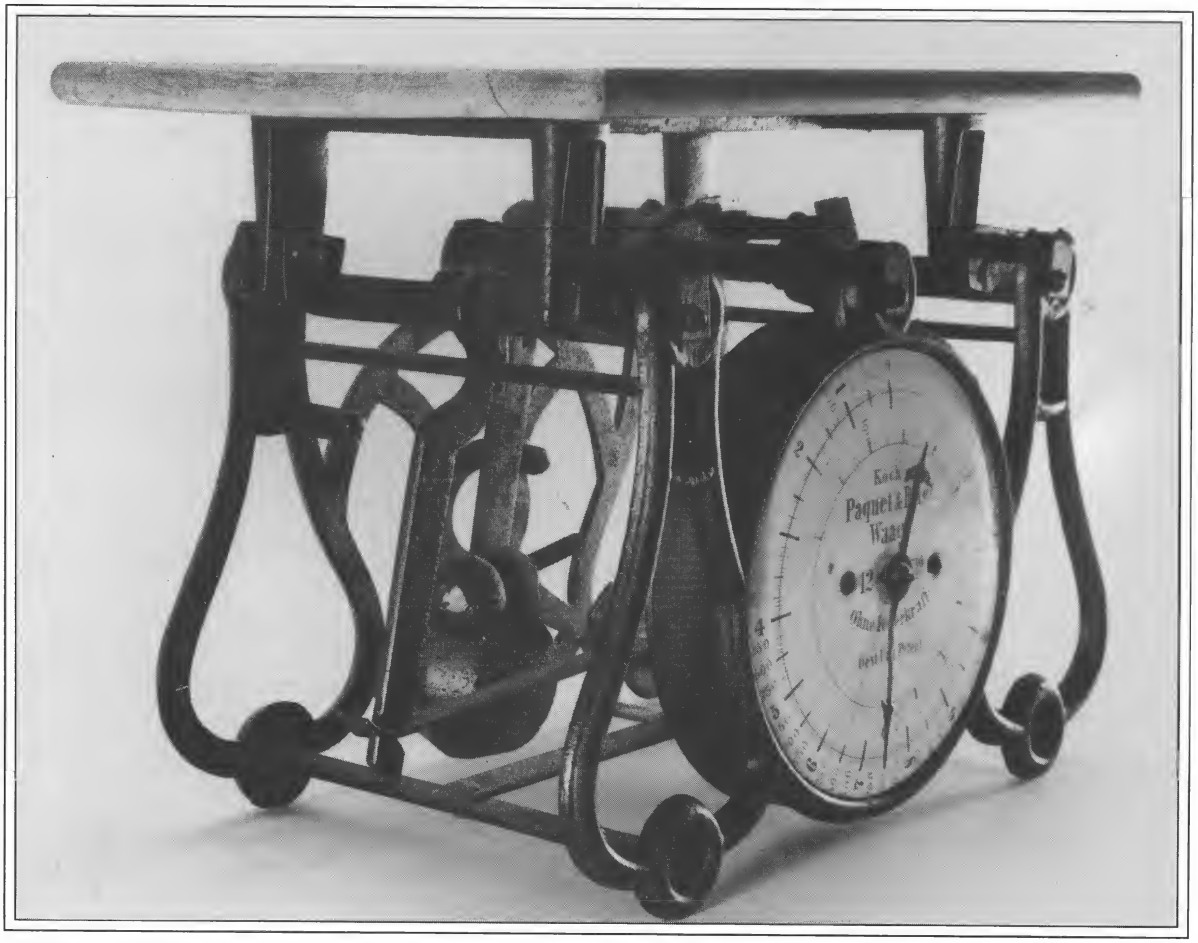
This uniface coin weight might have been familiar to Thomas Braby, using it when people came to pay for larger items. Let us hope that he did not have the matching half-guinea weight, as that would have precipitated some very heated arguments. The smaller weight was made 5½ grains too heavy! Gold was valued at 2d. per grain, so Braby might have demanded an extra 11d. on top of a valid 10s., in all innocence!

ISASC

EQUILIBRIUM®

1995—ISSUE NO. 3

PAGES 1917-1944



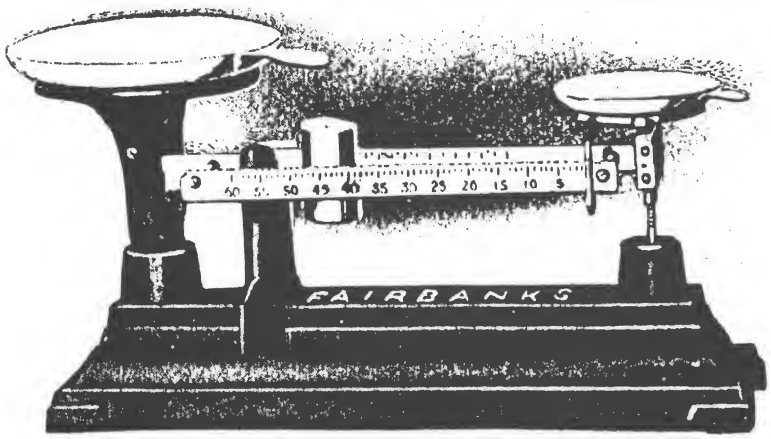
PAGE 1918

Cover Picture

See page 1919.

Fairbanks Fine Scales

To continue the theme of scales with two pans and two read–out positions, (after the US Union scales and the Koch scales on the cover), Fairbanks produced this peculiar reversible unequal–arm beam scale in their 1919 catalogue. Why they call the front poise a "rider" is puzzling, as it must have been permanently attached to the beam to allow accurate weighing on the larger pan. *They* code–worded it ILLEGAL, which seems appropriate! To quote: *"This is a very practical small scale, used principally by photographers, but as well for general laboratory work. For photographic use it combines in one, the two scales ordinarily needed in this service, being fitted with two pans and a double beam to weigh both in grains and avoirdupois ounces.*



The front bar of the beam is graduated 60 x 1 grains and is used with the small pan on the right. The rear bar is graduated 8 x 1/8 ounces avoirdupois and is used with the large pan at the left. Both bars are notched, the rear one having a sliding poise and the front one a rider. Both pans are of nickel–plated brass of a form suitable for the materials to be weighed and fitted with a handle for convenient lifting. The small pan is 2½ inches in diameter and the large pan, 4½ inches in diameter. The beam & poises are also nickel–plated, the stand being finished in black. Code ILLEGAL. .List Price $17.00."

INTERNATIONAL SOCIETY OF ANTIQUE SCALE COLLECTORS

Founded September, 1976

176 West Adams St.* Suite 1706 * Chicago, IL 60603 * USA * Tel. 312/263-7500

EQUILIBRIUM is published quarterly in January, April, July and October.

Editor--Diana Crawforth-Hitchins, 15 Hawthorn Ave., Headington, Oxford OX3 9JQ, England.

Associate Editor--Ruth Hendricks Willard, P.O. Box 27565, San Francisco, CA 94127, USA.

ISSN-0893-2883

Koch Parcel and Letter Scale

By D SCHMITZ

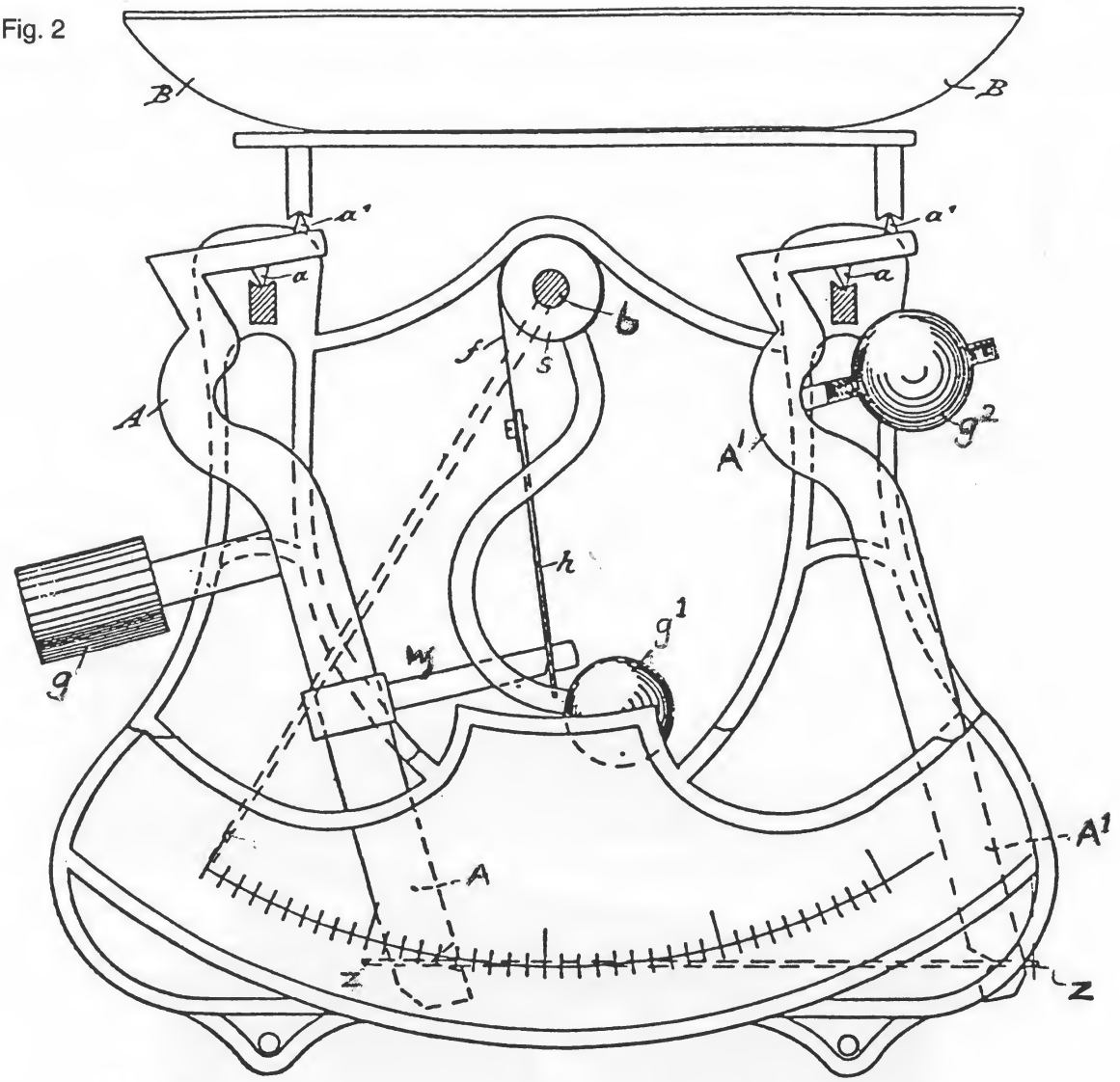
The scale shown on the cover and in figure 1 is a pendulum balance. The relevant Patent no. 56.587 of the Kaiserliches Patentamt was granted to the brothers Ferdinand and Carl Koch of Hanover. It was valid in the German Reich from 14th Jan, 1890.

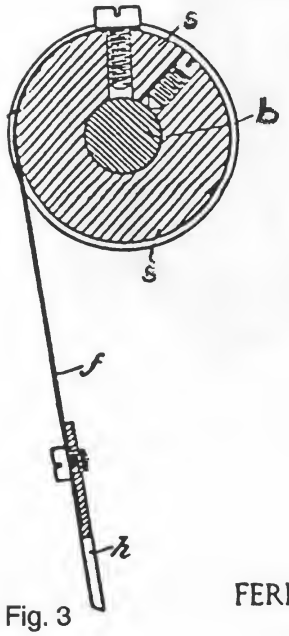
An extract from the Patent specification stated:
The following pendulum balance with top pan consists of the connection of two pendulums swinging in opposite directions; these are interconnected by a rigid or elastic tie element, one pendulum being designed as a pair of bent-lever balances which have positions for two moveable poises and the other pendulum being located between the arms of the first pendulums and acting on the pointer drive-axle.

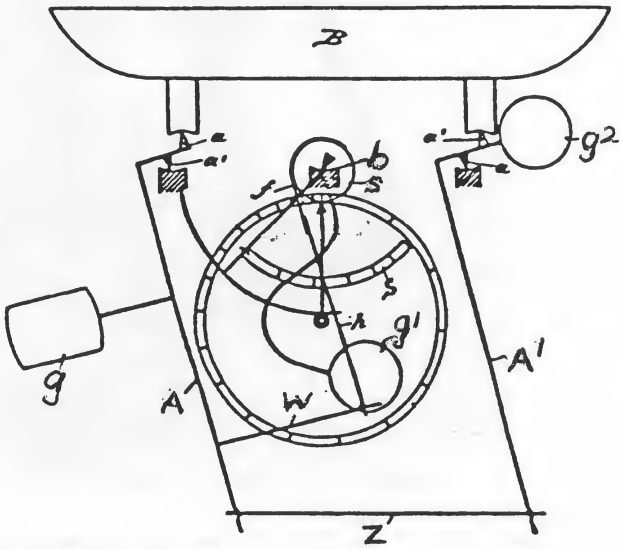
The patent specification describes several design possibilities working on the same principle. The balance shown on the cover and in figure 1 deviates from the patent specification, in for example, the pan, the graduated scales and in the ratio of the height to the width. The actual patent was claimed for:
....the union of a twin bent-lever balance supporting the weighing pan with a pendulum balance connected to the pointer drive-axle.....coupled by means of a lever and tie element....

Fig. 1
Another view of the Koch Parcel scale, showing the dial and its matching disc behind it, which conceals the mechanism operating the pointer. The left-hand bent-lever shows distinctly that there is no poise (counter-weight) mounted on it, as there is shown on the patent drawing in figure 2.

Fig. 2







Zu der Patentschrift

№ 56587.

FERDINAND KOCH UND CARL KOCH IN HANNOVER.

Fig. 3

Fig. 4

The third drawing of the patent specification (Fig. 4) shows the principle, in which the lever **W**, the tie–rod **h** and the tie–cord **f** constitute the linkage elements of the balances swinging in opposite directions. The balance represented is equipped with a leather strap serving as the tie–cord **f**.

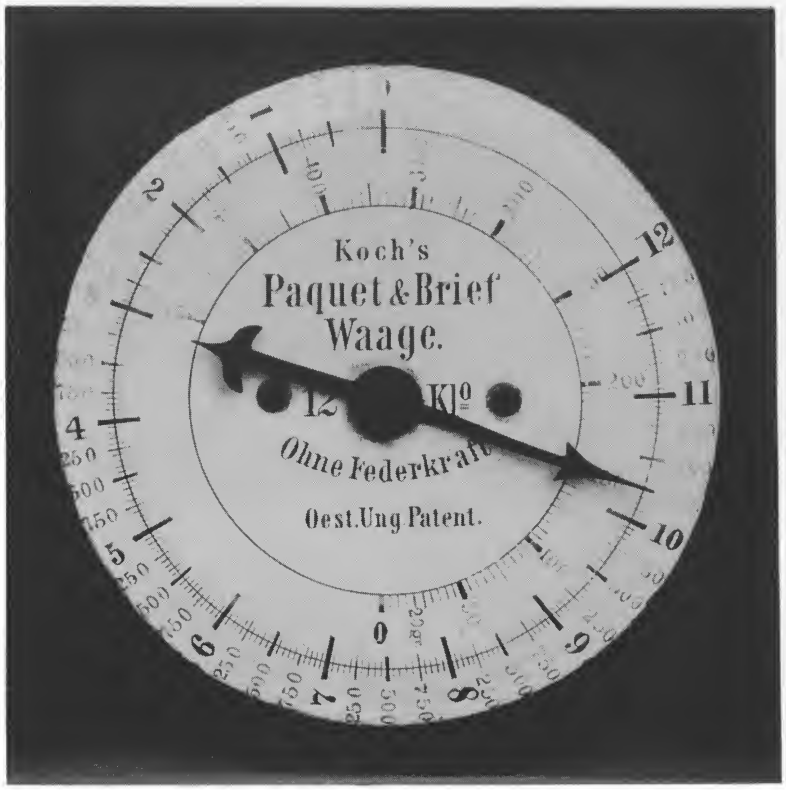


Fig. 5

The photograph in figure 5 show a further modification of the patent specification. The enamel–coated dial shows two separate sets of graduations and a two–ended pointer. The outer set of graduations has a weighing–range from 0 to 12 kilos (for parcels) and the inner one from 0 to 500 grammes (for letters). Please note that, in contradiction to the photograph, the pointer should have been assembled with its long end pointing upwards and its short end pointing down. Contrary to normal movements, the pointer turns anticlockwise.

The open rear view of this version in figure 6 (with the back of the dial removed) shows that the pointer is activated by means of a rack and pinion. The oak plate for the goods pan is 26 x 19 cm and 12 mm thick.

The second pendulum balance located in the centre is used as a letter balance. See Fig. 7. By means of bent lever **b–g** and two soldered lugs, a small pan, **B²**, is suspended on a free–swinging arm guided in a parallelogram.

An enquiry to the Archives of Hanover concerning the maker "Koch" informed us that quite a number of different companies held shares in "Koch". Other, earlier balances are known by these companies, and are well–known to collectors.

As early as 1890 the address–registers of Hanover include **Koch, Fuge and Wagner**, Patent–Waagenfabrik, Oberstr. 9, owner: Merchant Ernst Karl Wagner. In 1894 the name was changed to **C Ernst Wagner**, Waagenfabrik, Oberstr. 9 and in 1895 into **Wagner & Co.**, Patent–Waagenfabrik, Oberstr. 6, (as of 1896, Lehzenstr. 8), owner: Merchant Ludwig Schüt. Wagner & Co. existed until 1902.

Around 1890/91, the owners of the patent under discussion, Carl and Ferdinand Koch, founded their own company called **Gebrüder Koch**, Patent–Waagenfabrik, Engelbosteler Damm 80, (1892–94, Engelbosteler Damm 17 and 1895–96, Bohnenstr. 3A) owners: Mechanics Carl and

Fig. 6
Showing the rachet that operates the pointer.

Ferdinand Koch. In 1897, the company name was changed into **Gerke & Koch**, Patent–Wirtschaftswaagenfabrik, Bohnenstr. 1A, (1898–99 Engelbosteler Damm 18A), owners of this company: Merchant Louis Gerke (solely authorised to represent the company) and Lina, maiden name Küster, wife of Ferdinand Koch. The authorised manager was Ferdinand Koch. This company operated until 1899.

This great number of company names and ownership, as well as changes of address, permit speculation to be made now, as to the turbulence in balance–making in Hanover during that time of rapid industrial expansion.

Editor– This is a balance that I have never handled, but it is intriguing. It had affinities with the Union Scales from the USA, in that, again, the two pans were

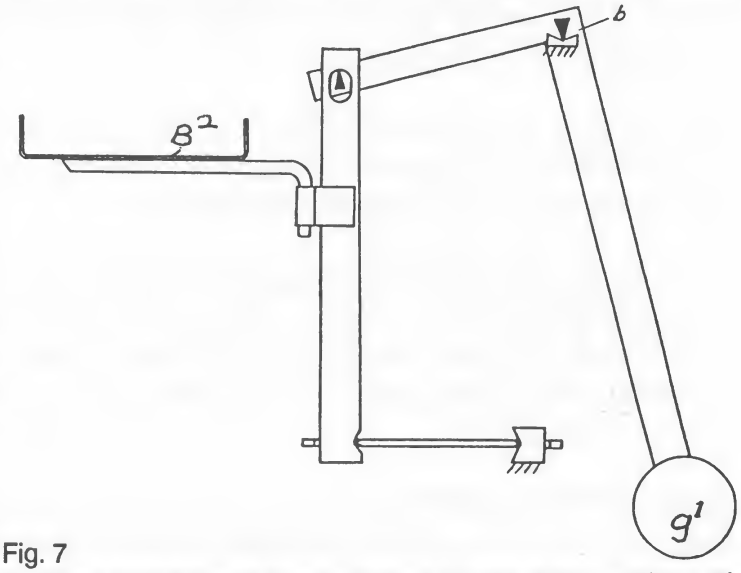


Fig. 7
Diagram explaining the attachment of the letter–scale to the central poise.

linked, so that a load on one pan depressed the other pan. They had the same disadvantage, in that the user had to remember which pan he was using and remember which set of graduations were to be used with that pan. German W & M inspectors demanded very accurate scales, and did not allow scales that might facilitate fraud, so presumably this design was not permitted for trade.

Note that the drawing in figure 2 shows a poise, $\mathbf{g^2}$, on the right-hand arm, $\mathbf{A^1}$, on a screw-thread, which could be used for fine adjustments, or to tare the top pan. This poise seems to have been omitted in the production model shown on the cover. The main resistant appears to be the poise **g** in figure 2, but on the

Fig. 8

Another Koch Parcel scale, with the added letter scale out to the left (as seen from the rear). The soldered fixing for the letter scale is just visible to the right of the left-hand open-work 'leg'.

production model it seems to be the central poise, which has a small ball-shaped poise attached directly above the main poise, on a screw-thread, visible on the cover picture. Such development of the first idea, to a simpler model, is the hall-mark of a thoughtful designer working with an intelligent manufacturer. In figure 2 the pointer was extended to near the bottom, to give a good sweep across the graduated arc.

Figure 4 showed a poise, $\mathbf{g^2}$, on the other side of the pivot, above the bearing. The pointer worked in two ways, directly through a curved slot in the dial, with widely spaced graduations at the beginning, presumably for the 0-500 g set of graduations, and indirectly, via a cog and rachet, to a rotating pointer going clockwise round the dial, again, widely spaced at the beginning and getting closer together as it indicated the bigger loads, a classic sign that this was a pendulum balance.

Figure 7 shows a bent lever with a hanging pan and a little adjusting poise on a screw-thread. It shows an arm length (between the two bearings) that was much longer than the arm length on the other bent lever in Fig. 3. This allowed a much greater sweep of the pointer round the dial with the lighter load. Of course, the distance between the bearing **b** and the poise **g** also influenced the sensitivity, as did the mass of the poise **g**.

This article (without the editor's comments) was first published in Mass und Gewicht in June 1994. The cover photograph was taken by Rainer Schulz of Wesel. The author thanks fellow-collector Johannes Schlender for the sketch Fig. 7, of the letter scale attachment and for helping with the technical description. Thanks are also given to the Archiv der Stadt Hannover.

Local Verification Marks

By N BIGGS

The Administrative Background PART TWO-- the reforms of the 1830s.

The Weights and Measures Acts of 1834 and 1835

Throughout the nineteenth century, improvements in Weights and Measures legislation went hand-in-hand with reformation and rationalisation of the local government system. In 1834-35 there were significant developments on both fronts.

The first step was a Weights and Measures Act of 1834 (4 & 5 William IV c. 49). This extended previous legislation in several ways, the most noteworthy being that local authorities were required to appoint Inspectors, whose duties were to include stamping weights with a verification mark after they had been checked and found to be correct. Unfortunately the 1834 Act had a number of technical deficiencies, and it was repealed and amended by a new Act in the following year (5 & 6 William IV c.63). The Act of 1835 specified that

'*...in England, at the General or Quarter Sessions of the Peace... the Justices of the Peace of every County, Riding, or Division, or County of a City or County of a Town ... shall determine the Number of Copies of the Imperial Standard Weights and Measures which they shall deem requisite for the Comparison of all Weights and Measures in use within their respective Jurisdictions ... and shall appoint a sufficient number of Inspectors of Weights and Measures for the safe Custody of such Copies ... and shall allot to each Inspector a separate District, such District to be distinguished by a Number or Mark...* '

The details of this provision will be discussed in detail in the rest of this article. At this point we shall merely remark that almost all counties appear to have implemented the Acts of 1834 and 1835 without delay. Many additional standards were issued at this time, often because extra Inspectors had to be appointed. For example, Kent had purchased five sets of standards in the years 1826-31, but seventeen Inspectors were appointed in 1835, so another twelve sets were verified for the County.

The definition of a county

Traditionally, there were forty counties in England. But since medieval times a few of them have been divided for administrative purposes into units which were effectively counties in their own right. The North, West, and East Ridings of Yorkshire, are the best-known examples, but there were similar divisions elsewhere: in Lincolnshire the Parts of Holland, Lindsey, and Kesteven, and in Sussex the East and West Divisions, all had full county status. So it is difficult to define exactly what constituted a county. For the purposes of discussing Weights and Measures administration we simply list what we shall consider to be the county-units in 1834 (Table 1).

Divisions of the counties

As may be inferred from the mention of 'Districts' in the extract from the 1835 Act given above, almost all counties were far too large to allow effective control of their day-to-day affairs. For this reason they were divided into districts, each district having some form of separate existence under the jurisdiction of the county authority. Even before the Domesday Book (1086) the counties had been divided in this way, into units called *hundreds*. The Domesday division was remarkably persistent, even though there was little logic or uniformity about it. For example, in 1835 there were 6 hundreds in Middlesex and 33 in Norfolk, and in both cases the hundreds were exactly the same as they had been in 1086. A minor complication was that some counties used a different name for the unit corresponding to a hundred. It was known as a *wapentake* in the old

Table 1
English Counties in 1834 – a working list

Bedfordshire	Hertfordshire	Salop (Shropshire)
Berkshire	Huntingdonshire	Somerset
Buckinghamshire	Kent	Staffordshire
Cambridgeshire	Lancashire	Suffolk *
Cheshire	Leicestershire	Surrey
Cornwall	Lincolnshire (Parts of Holland)*	Sussex (East)
Cumberland	Lincolnshire (Parts of Kesteven)	Sussex (West)
Derbyshire	Lincolnshire (Parts of Lindsey)	Warwickshire
Devon	Middlesex	Westmorland
Dorset	Norfolk	Wiltshire
Durham	Northamptonshire	Worcestershire
Essex*	Northumberland	Yorkshire (East Riding)
Gloucestershire	Nottinghamshire	Yorkshire (North Riding)
Hampshire*	Oxfordshire	Yorkshire (West Riding)
Herefordshire	Rutland	

Notes: 1. As explained in the article, other areas were also treated as counties for Weights and Measures purposes at various times. Among them were the 'counties corporate' (Table 2), and a number of 'liberties' (Table 3).

2. The counties marked with an asterisk had, at certain times, more than one central administrative authority. The details vary from place to place.

3. The list remained essentially unaltered until 1889.

Danelaw region --the Ridings of Yorkshire, the Parts of Lincolnshire, Leicestershire, Nottinghamshire, Derbyshire and Rutland, and as a *ward* in the northern counties --Northumberland, Durham, Cumberland and Westmorland. The word *lathe* was used in Kent and the word *rape* in Sussex.

For many centuries the hundreds were the divisions of the county in practice. They were, for example, the areas for which High Constables were appointed. But in most counties the importance of the hundred as an administrative division had declined considerably by 1835, although the hundreds remained the units for Census purposes until 1851. The reason for the decline was that the justices of the county had become accustomed to arrange themselves into 'divisions', partly for their own convenience. The practice of holding 'Petty Sessions' (as opposed to the full Quarter Sessions) had grown up around these divisions, and by several Acts of George IV and William IV the justices were empowered to adopt and alter petty sessional divisions as they chose. Consequently the petty sessional division gradually superseded the hundred as an area of local government administration in practice.

County and district stamps in the time of William IV

It seems that in some counties it became the custom for the Examiners appointed under the Act of 1795 to stamp weights which they had checked, at least from around 1826 onwards. As we have noted, the Acts of 1834 and 1835 made it compulsory for the newly-appointed Inspectors to do this. There is thus a potentially complex evolution of marks in the short reign of William IV (1830-37).

In Hampshire the 'early' mark was C*S (Figure 1), denoting the 'County of Southampton' (a traditional but confusing name, given that the city of Southampton had a separate status). As we have noted, the High Constables of the hundreds were responsible for Weights and Measures in the early 1800's, and at one time they had ordered standards for every parish. But around 1830 the petty sessional divisions of Hampshire were reorganised, becoming 14 in number, and in

1835 a weights and measures inspector was appointed for each of these divisions [1]. Actually, two of the divisions, Basingstoke and Odiham, were assigned the same inspector, so there were only 13 inspectors in all. The 13 letters A,B,C,D,E,F,G,H,I,K,L,M,N, were used to identify the inspectors, and these were added into the mark. Thus weights from Hampshire after 1835 carry the C*S mark with an additional letter, such as H for the Petersfield district (Figure 2). Later the letters O,P, and R were also used.

In Oxfordshire the 1834 Act inspired the mark OXON with the date 1834 (Figure 3). After the revised Act of 1835 a new mark with the date 1835 and a district number (not a letter) was used (Figure 4), and after a while the date was dropped (Figure 5).

Fig. 1 on the left.
Hampshire, before 1835.

Fig. 2 on the right.
Hampshire, Petersfield district, 1835–1890.

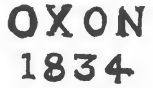


Fig. 3 on the left.
Oxfordshire, 1834.

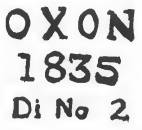


Fig. 4 on the right.
Oxfordshire, district 2 (West Bampton?), c 1850–1880.

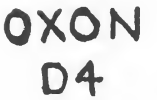


Fig. 5 on the left.
Oxfordshire, district 4 (Bullingdon?), c 1850–1880

Fig. 6 on the right.
Middlesex, district 2 (Finsbury).

Fig. 7 on the left.
Middlesex, district 1 (Tower Hamlets).

In the County of Middlesex, the petty sessional divisions were well–established by the end of the eighteenth century, and they bore little or no relation to the traditional hundreds of the county. The City of Westminster was regarded as a division of Middlesex for some purposes, but under Local Acts it had separate jurisdiction for Weights and Measures purposes. There were four other divisions, whose names varied from time to time. They usually took their names from the places where the petty sessions met, but they each extended to the rural borders of the county [2]. Thus it was natural that these four divisions should eventually become the four Weights and Measures districts for the county. The county mark was a shield with three seaxes (curved swords), and to this was added a number representing the district: 1 ('Tower Hamlets'), 2 ('Finsbury'), 3 ('Holborn'), 4 ('Kensington'). See Figure 6. Somewhat later, the initial of the inspector's surname also appeared (Figure 7).

These few examples show that the typology of the marks varies considerably from county to county, and each case requires careful study. A very useful list of inspectors appointed under the Act of 1834 appears in the *Parliamentary Papers* for 1835 [3]. In several cases the inspectors were appointed to represent the petty sessional divisions existing at that time, but in some cases the hundreds are also mentioned.

The Municipal Corporations Act of 1835

The problem of rationalising the numerous and diverse authorities claiming to be exempt from the jurisdiction of their county was attacked first in the Municipal Corporations Act of 1835. This Act specified 160 named boroughs in England (and 18 in Wales) which were to be

recognised as 'Municipal Boroughs', and in which a form of democratic control was to operate. Most of the old towns which had been 'boroughs by prescription' had their status confirmed by this Act, but the pocket boroughs were excluded. The status of a number of places was unresolved, and these were henceforth known as 'unreformed boroughs'. Also, provision was made for the recognition of new boroughs, so that places where governance was still in the manorial style would be encouraged to set up democratic procedures and be assimilated into the new system. Thus it was that in 1838 both Manchester and Birmingham became municipal boroughs.

Unfortunately, the Weights and Measures Act of 1835 did not specifically refer to the municipal boroughs established by the Municipal Corporations Act of the same year. For that reason the role of the boroughs in the supervision of weights and measures remained unclear for a good many years after 1835. We shall return to this topic in due course.

The counties corporate

In the extract from the 1835 Act given at the beginning of this article there is mention of places described as a 'County of a City or County of a Town'. This referred to the 17 historically important towns and cities which were known collectively as 'counties corporate' (Table 2). All of these did indeed become municipal boroughs in 1835, although for many years after that their authority continued to derive from their status as counties corporate.

TABLE 2

The seventeen English counties corporate in 1834

Bristol	Exeter	Lincoln	Nottingham	York
Canterbury	Gloucester	London	Poole	
Chester	Hull	Newcastle	Southampton	
Coventry	Lichfield	Norwich	Worcester	

Notes 1. The City of London had a status rather different from the others.
2. Oxford and Berwick-upon-Tweed were sometimes treated as counties corporate, and in earlier times Chichester, Hereford, Scarborough, Stamford, and Winchester had also been so designated.
3. Coventry ceased to be a county corporate in 1842.

It seems that most of the counties corporate fulfilled their obligations by appointing inspectors under the Act of 1835. Of course, a number of them had been carrying out some form of weights and measures regulation for many years before that. Verification marks used by their inspectors have been identified in most cases (see Figures 8–18). But apparently we do not know the marks (if any) used in Canterbury, Lichfield, and Poole, and the identification of the marks used in Gloucester and Southampton is uncertain.

Other localities with separate jurisdiction

It will be recalled that there were a large number of localities which, for various reasons, claimed to be exempt from the authority of the county in which they were geographically situated.

Fig. 8 on the left
Bristol.

Fig. 10 on the left.
Coventry.

Fig. 9 on the right.
Chester.

Fig. 11 on the right.
Exeter.

Fig. 12 on the left.
Hull.

Fig. 13 on the right.
Lincoln.

Fig. 14 on the left.
Newcastle.

Fig. 15 on the right.
Nottingham.

Fig. 16 on the left.
Norwich (used from the 16th century onwards.

Fig. 17 on the right.
Worcester.

Fig. 18 on the left.
York.

A section (XXV) of the Weights and Measures Act of 1835 provided that

'... in the Town of Berwick–upon–Tweed and all other places which have been or shall be hereafter authorized under the provisions of any Act of Parliament, whether local or otherwise, to appoint Inspectors or Examiners of Weights and Measures, and in all other Places which have been or shall be hereafter by Charter, Act of Parliament, or otherwise, possessed of legal Jurisdiction and which have been or shall be hereafter provided with Copies of the Imperial Standard Weights and Measures verified and stamped at the Exchequer, it shall be lawful for the Magistrates of such Places, or for any other persons who may be so authorized as aforesaid, to appoint an Inspector or Inspectors of Weights and Measures ... '

The effect of this provision was to allow many localities which had previously claimed jurisdiction over Weights and Measures to continue to do so, provided they had purchased a set of standards. The large number of places which had done so is evident from the list of 1835 [3]. It included many boroughs (which may or may not have been recognised by the Municipal Corporations Act), parishes authorised by Local Acts, and certain liberties (see below). Later sections of the Act authorised the continuance of the activities of manorial Courts Leet, and made specific allowance for the City of London. Finally, there was specific reference to the towns of Oxford and Cambridge, where the Weights and Measures authority resided in the officers of the University.

Examples of the marks used by some of these localities in the 1830's are shown in Figures 19–22.

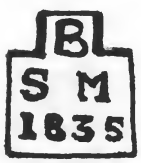


Fig. 19 on the left.
St Marylebone 1835–?

Fig. 20 on the right.
St Pancras (still in use in 1866).

Fig. 21 on the left.
Manor of Stockport.

Fig. 22 on the right.
Oxford (University was W & M authority for the city until 1865).

Liberties

It will be recalled that there were several kinds of areas which claimed the title 'Liberty'. Those which are of major importance in the context of Weights and Measures jurisdiction are listed in Table 3.

Table 3
The Major Liberties

Bury St Edmunds	'Western Division' of Suffolk
Isle of Ely	Three hundreds in Cambridgeshire
Ripon	Part of Yorkshire (North Riding)
Soke of Peterborough	Nassaburgh hundred of Northamptonshire
St Albans	Part of Hertfordshire

Note The towns of Bury St Edmunds, Ripon, Peterborough and St Albans were also municipal boroughs in their own right, but the town of Ely never aspired to the title of borough. Each borough had jurisdiction separate from its liberty in some respects.

All these were large areas which remained exempt from the authority of their geographical county for much of the 19th century. In 1850 an Act of Parliament opened the way for a Liberty to merge with its county, and indeed the Liberty of St Albans did become part of the administrative county of Hertfordshire in 1874. But the Liberties of Bury St Edmunds, Ely, Peterborough and Ripon persisted, and in the great reforms of 1889 the first three became administrative counties in their own right.

Verification marks from all five of these liberties are known (Figures 23–27).

Fig. 23 on the left
Liberty of Bury St Edmunds.

Fig. 24 on the right.
Liberty of the Isle of Ely.

Fig. 25 on the left.
Liberty of Ripon.

Fig. 26 on the right.
Liberty of the Soke of Peterborough.

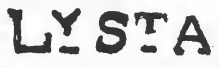


Fig. 27 on the left.
Liberty of St Albans

A number of other liberties, of various kinds, also claimed jurisdiction over Weights and Measures. An intriguing case is that of Cawood, Wistow and Otley, in Yorkshire. Cawood was the seat of the Archbishop of York, and the other places were also under his jurisdiction. However, the details of the administrative arrangements are not known: indeed, one standard reference work on local government [4] raises doubts as to whether this Liberty (or Liberties) actually functioned as an independent unit. But we know that an inspector (Daniel Forster of Otley, gentleman) was appointed for this authority in 1835 [3] and at some time there was certainly an inspector who stamped weights for the Liberty, because his mark, a bishop's mitre above the letters CWO, turns up from time to time (Figure 28). The other liberties listed in Table 4 are

Fig. 28 on the left.
Liberties of Cawood, Wistow and Otley.

Fig. 29 on the right.
Liberty of the Tower of London (still in use 1882).

known to have had either standards or inspectors at various times, and it is reasonable to suppose that they were indeed engaged in the verification of weights and measures. The mark of the Tower of London is shown in Figure 29.

TABLE 4

Other Liberties known to have had W&M jurisdiction at some time in the 19th century
Cawood, Wistow and Otley: three areas of Yorkshire, under the jurisdiction of the Archbishop of York.
Havering–atte–Bower: the parishes of Havering, Hornchurch and Romford in Essex.
Romney Marsh: a rural part of Kent. Not to be confused with the town of New Romney, which was itself a borough.
St Ethelred's: a division of Suffolk, based at Woodbridge.
Southwell and Scrooby: in the county of Nottingham. [5]
Tower of London: a small area surrounding the Tower, geographically part of Middlesex.

Note: The Cinque Ports, treated as a single entity, are sometimes referred to as a Liberty. In fact, the constituent towns seem to have operated separately for W & M purposes, relying on their status as boroughs of various kinds.

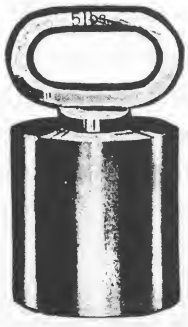
References

1 Hampshire Quarter Sessions Records, 19 December 1835. (Information kindly supplied by Philip Lloyd.)
2 Webb, S & B, *English Local Government – The Parish and the County*, Longmans, London 1906.
3 A Return of all Inspectors of Weights and Measures, *Parliamentary Papers,* 1835, XLVIII.
4 Lipman, V D, *Local Government Areas*, Blackwell, Oxford, 1949, p 69.
5 Webb, S & B, *English Local Government – The Parish and the County*, Longmans, London 1906, p. 317.

Bullion weights, USA

All made by Henry Troemner of Philadelphia, from the 1930 catalogue that was still current in 1941.

Nickel–plated Drawn Steel Weights . *"Grade B Tolerance. These weights are made of cold drawn steel, of selected stock, turned and free from blemishes, and then nickel–plated. The larger weights are cupped, with handles passing through cup. All are free of projecting parts, making it possible to stack them. These weights being of one solid piece of steel, have no loose or screwed parts, and will show instantly any accidental or intentional change in their mass. They are adjusted within the tolerance requirements as required by the Bureau of Standards, by means of a lead plug driven into a hole bored in the top of the weight, the seal being affixed directly over the plug. Furnished in sets in Troy Standard. Sets 500, 200, 100, 50, 20, 20, 10 ounces $105.00, or separately, 500 oz.... $38.00"*



Nickel–plated Steel Grip Handle Weights. *"Grade B Tolerance. These weights are made of selected steel, the body in one piece, the handle screwed into the body. All the adjusting is done on the handle stem, so that there is no loose adjusting material used. They are finely nickel–plated and adjusted within the requirements of the National Bureau of Standards. Sets 500, 200, 100, 100, 50, 20, 20, 10 oz, $80.00, separately 500 oz.... $35.00."*

Single Iron Troy Weights. *"Grade T Tolerance. These Weights are made of one solid piece of cast iron. They are similar to Fig. 9600 [on the left] except that they have the denomination stamped on the top rim; the larger weights have the top depressed, with a bar handle running across the cup. The smaller weights are cylindrical, with denominations on top. They are adjusted by means of a hole on top rim; into this hole lead is driven to adjust. This is the cheapest form of Troy weights possible. 500 oz.... Troy $16.00". [Kilo version only shown in the catalogue].*

More Flexure Springs Part 2 By D Crawforth-Hitchins

T H Ward took out British patent (see Fig. 19) no. 3635, on 24th July, 1883. The abridged patent stated *"Spring:- Reference is made to Specifications No. 3580 and 3581, A.D. 1881.* [Neither of these are in the Abridged Specifications.] *Curved spring plates A connect two shackles a, a^2 so that, when the weight is applied, the spring plates are drawn together (or further apart as the case may be) and this motion is connected by means of a rack B and pinion, or by a toothed quadrant, to a pointer which moves over a dial E. A modification shown and described has a set of four jointed bars, similar to lazy-tong links, in place of the spring-plates, with a spiral spring forcing them apart."* This description may concern strip plates, and thus use flexure springs, or it may concern circular discs. The drawing looks as if they are strips. The patent is for the method of registering the weight on the dial.

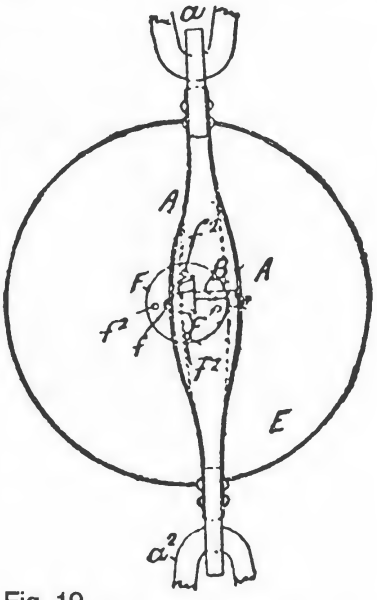


Fig. 19.
T H Ward's patent, 24 July 1883.

Edward Frederick Bergman and John Ruggles Slack applied in both Paris and London on 9th July, 1889, for their patent. French patent no. 199477, granted on 8th August 1889, had drawings of four variations, (Fig. 21) and British patent no. 11,028, of 9th July 1889, showed the same variations in the full patent specifications, and Fig 1 and Fig. 5 in the abridged specifications. Figs. 1, 3 and 5 were for compression springs, Fig. 1 being a full inverted U-spring, and 3 and 5 were for half an inverted U-spring. Fig. 6 was for a tension spring. They were to be made with a rectangular hole in the handle, so that they could either be hand-held, or slipped onto a wall-mounted bracket. Fig. 3 was permanently attached to the wall. Fig. 5 had two load positions, so must have had two sets of graduations on the arc. None have been recorded, but they look very practical.

Another man with a foreign name, C Leni, patented a very primitive coin scale, British patent no. 10,105, on 27th May 1892. See Fig. 20. If it was ever made it must have caused endless irritation as the heavier coins slipped off the balance. A 5/- crown would surely have toppled off before the user had ascertained whether or not it was full weight.

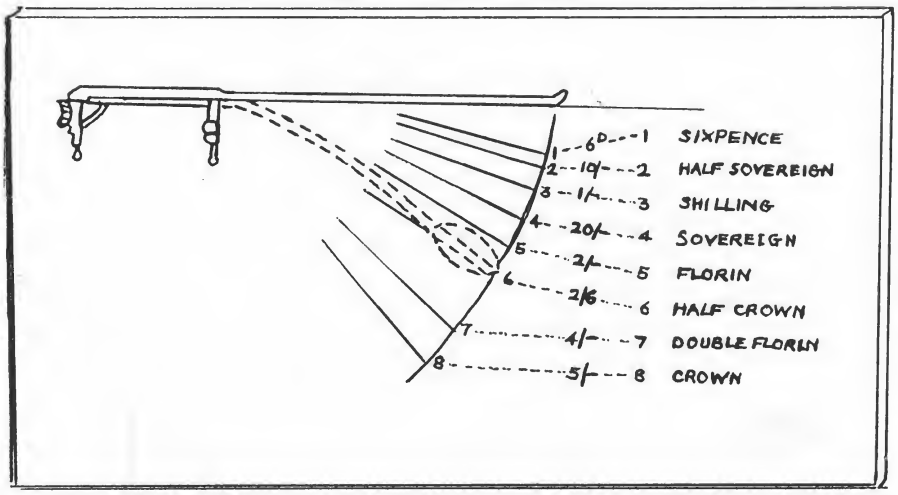


Fig. 20. *"Spring balances for treating coins.....The back-plate to be fixed to a desk or equivalent."* Never seen.

R R Bevis and M G Clayton took out a patent no. 15,843 (see Fig. 22) on 6th November 1909, for

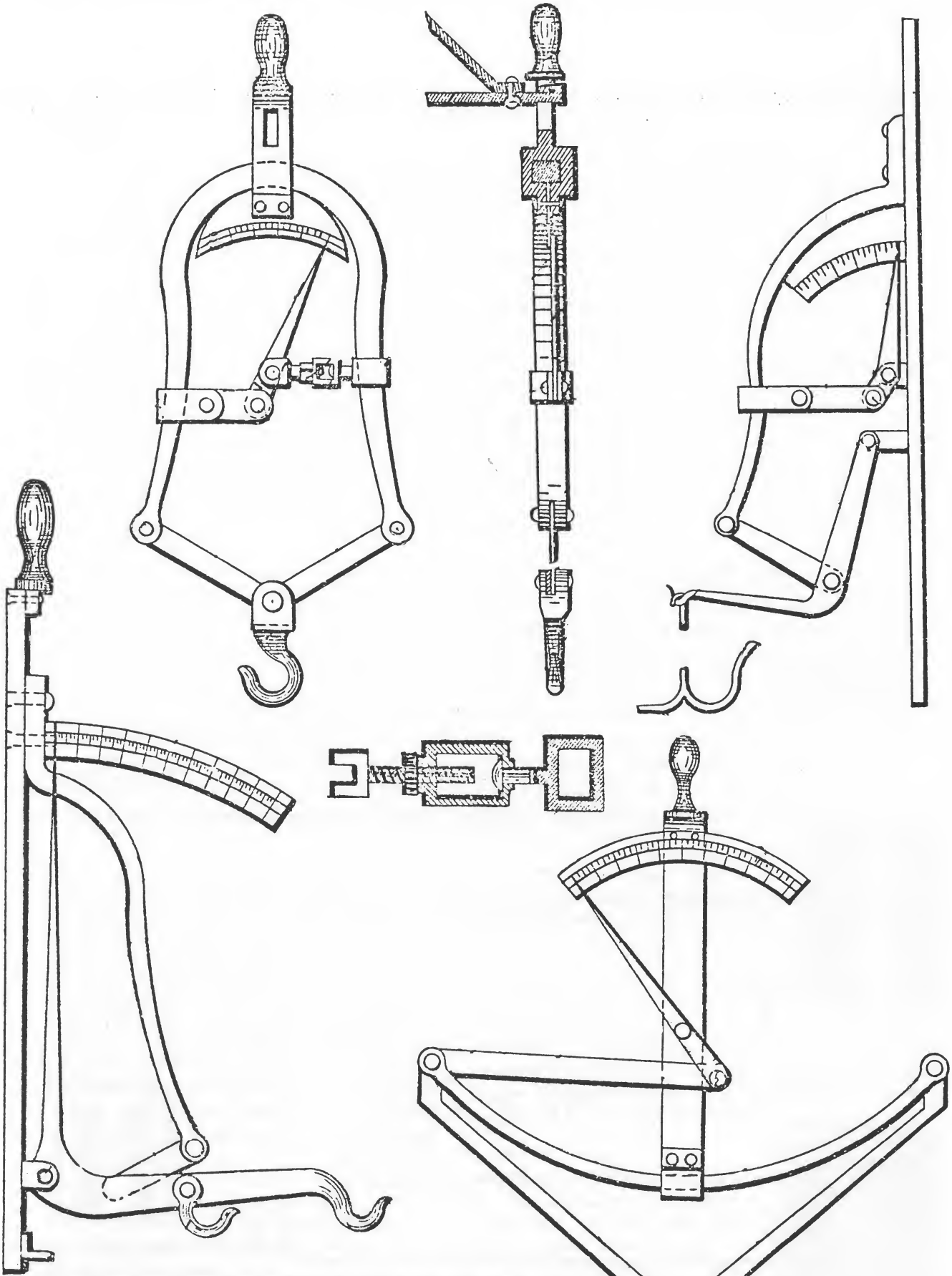


Fig. 21. Bergman and Slack's French patent of 9 July 1889.

"Spring balances:– Relates to weighing–apparatus wherein the weight is measured by the amount of extension of a metal bar. To the sides of the bar 1 are secured bowed metal strips 2 connected at the middle by curved strips 3. The extension of the bar under a load is multiplied by the strips 2, 3 and this rotates an indicating–pointer 5 by means of a flexible connexion [sic] 4. In a modification, the lower ends of the strips 2 are connected to a T–shaped bar secured to the bar 1; in a further modification, mirrors may be attached to the strips, and operate in conjunction with a beam of light and a suitable scale." The use of a beam of light is advanced for 1909, being more associated with precision balances than with rugged scales. As no indication of capacity or function is given on the patent, perhaps this was intended for use as a precision balance! No example has been seen.

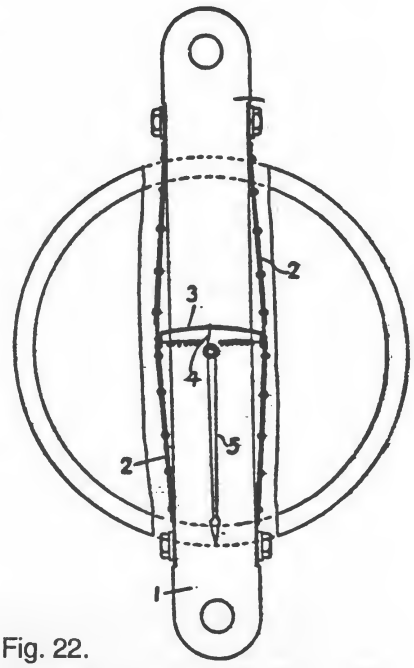


Fig. 22.
Bevis & Clayton's 6 Nov 1909 patent.

P J Maul's tiny postal scale, DRGM 318707, illustrated in his catalogues of 1909 and 1912, was discussed in the article about Maul on EQM page 1651, but it is included in this article because (a) it is the smallest flexure spring scale, and (b) this article makes an attempt to cover all the flexure spring scales invented. See Fig. 23. There are a few hi–fi needle testers that are almost as small as Maul's waistcoat pocket scale, but, being pressure gauges, they are not scales.

Fig. 23.
P J Maul's waistcoat–pocket letter–scale, from the 1909 catalogue.

The Postage Saver aluminium postal scale, figs. 24 to 26, was made by Dakin Manufacturing Co. for Allied Development Corp, Chicago 3, Ill. USA. It was so light and flat that it was very practical to carry permanently in the breast pocket. The one in the drawing had the postage rates for 1944 to 1946, and the one in the photograph had postage rates for 1946 to 1949. They were supplied in a brown mock–leather slip case, in a box. See Old Advert on p. 1944.

The "Presto" letter scale was made by "Metal Spec. Mfg. Co. Chicago 24, ILL, patent appl'd for." Michael recorded that it was made by the Kingsbury Mfg. Co, but I can find no evidence to substantiate that. It was made 1946–1949, and has a label on the front in the fashionable green and cream, the colours of so many articles in the late 1940s and 1950s. It is very ugly but it has its place in any collection of postal scales. Fig. 27.

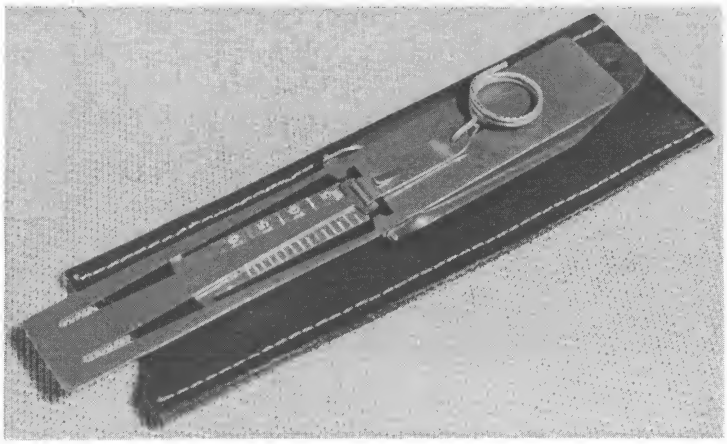
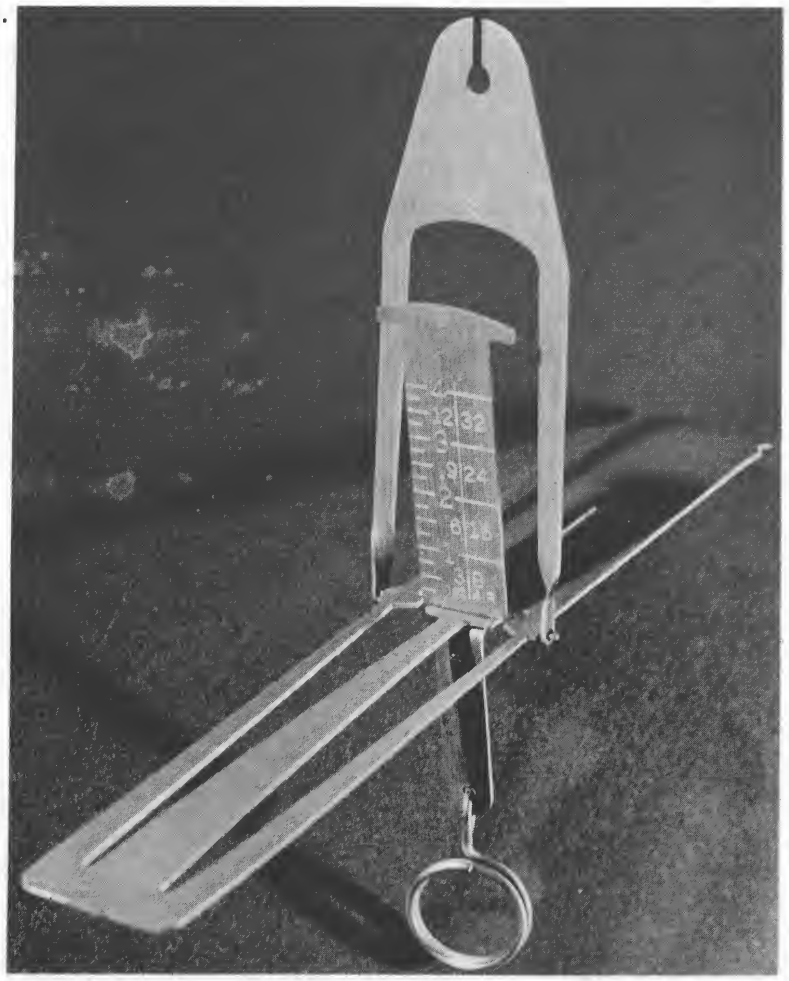


Fig. 24 Postage rates for 1944–1949.

Fig. 25.



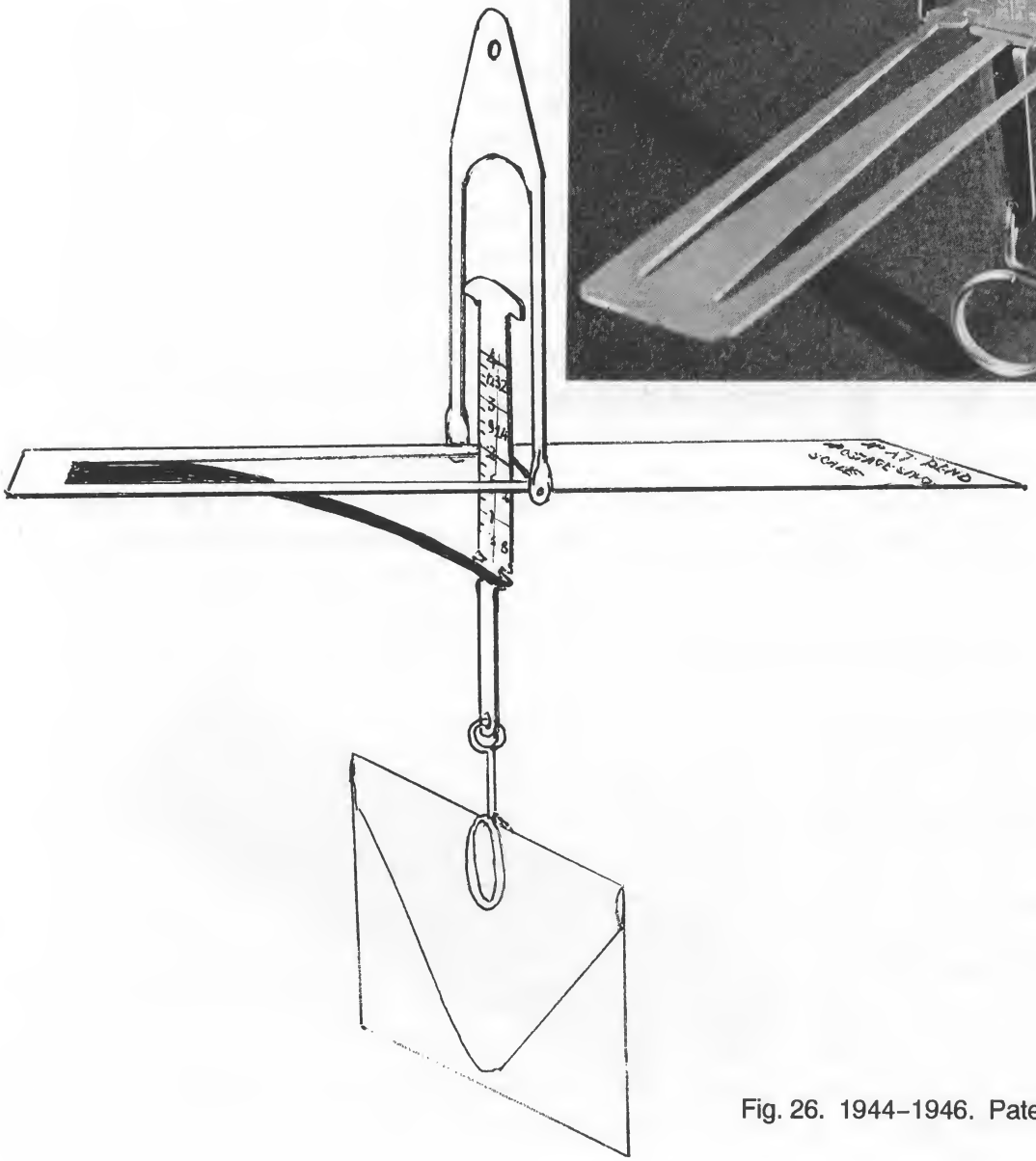
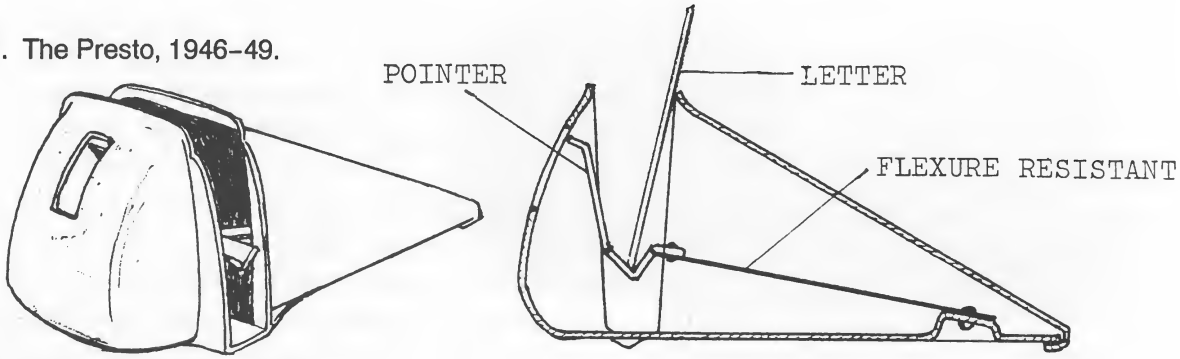


Fig. 26. 1944–1946. Patent pending.

Fig. 27. The Presto, 1946–49.



To be continued in the next EQM.

Review

Lions Ships and Angels, identifying coin–weights found in Britain, by P and B R Withers, Galata, 1995, £15 plus packing and postage £1. ISBN 0 9516671 3 0. (80 pages, over 630 black–and–white photographs and 75 line drawings.) Available from Galata Print Ltd., The Old White Lion, Market St, Llanfyllin, Powys, SY22 5BX.

This is the book that we needed when we started collecting coin–scales and weights 22 years ago. The expert authors (ISASC members) can still look at a coin–weight as an amateur would, and then classify from that view–point, making this a user–friendly book. It enables an owner to look at the weight, see a picture, look it up under that heading, and be led to an answer; or the owner can read some words on the weight, look in the index under that heading and get to a satisfying answer.

This seems so obvious, but how many authors have that straight–forward approach? How many use obscure words? How many try to blind us with their expertise? Paul and Bente stand out as superb examples of how to approach their subject with clarity, logic and in a comprehensive manner. Their humour, enthusiasm and lack of pomposity shine through.

The book covers weights made in Britain and weights made on the Continent for British coins, with statements to separate them, ("Those without a reverse are often German." and "We do not know of any continental weights bearing a spur ryal design") A substantial section deals with weights from the Low Countries, a complex and rich source of weights. This section was compiled with a major contribution from Ivan Plets, ISASC member, enthusiast and expert.

Fig. 1. Photos Gary Batz
Guinea weight made by John Kirk, and stamped by the Mint. Conforms to the New Standard promulgated in 1775.

Fig. 2 —> Courtesy Jaap Visser
To which Act did these weights relate? Why would a user weigh coins so far below the current Standard of 122.5 grains? And which balance did he have access to, that was accurate to 5 decimal places?

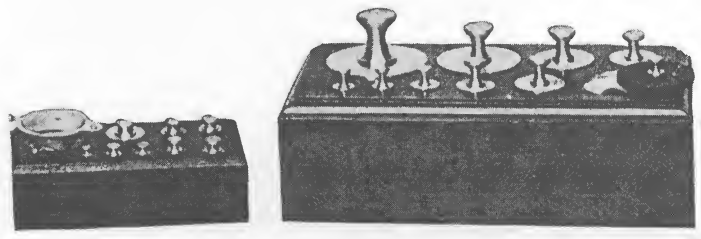
The revaluation of gold coins in 1612 at a value 10% higher than previously, led to an interesting crop of coin weights in those heavy boxes of scales and weights of the period, but the Withers gives no explanation as to why they include James I coin-weights at two values. Also, many readers would have been assisted by a brief explanation of the New Standard and the various weights for the Guinea that were permitted by the Act of Parliament of 1774, promulgated in 1775 and enacted in 1776. Also, it may be obvious to the mathematically-minded that half of 5.8 is 2.16, but most people need to be told that there are 24 grains in one pwt.

These minor omissions point up the major inclusions of all the important influences and consequences. This scholarly book is superb, a delightful jaunt through the bye-ways of coinage, and essential for anyone with any coin weights, but who does not want to buy their £95 tome, *British Coin Weights,* published last year. I heartily recommend this book. D F C-H

Fig. 3. Courtesy Jerry Katz
Gold weights by S Mordan & Co, supplied in a maroon morocco box with gold-tooled lettering. For sovereign and half-sovereign.

Bullion Weights, USA

Made by Henry Troemner. From the 1930 catalogue, still current in 1941.



"Grade C tolerance. The weights are made of polished brass and lacquered, with screw knobs. All the adjusting is done on the knob stems. No loose balancing material is used. Each weight from ¼ oz up is fitted into a separate hole in oak wood block. The weights below ¼ oz are in covered well in the block. Furnished with dwt and grain weights....Set from ½ grain-500 oz Troy, total weight 1000 oz $130.00."

Review

Bullion Weights, an outline catalogue, by Norman Biggs, White House Publications, 1995, £7.00 packing and postage 50 p. ISBN 1 898 310 025. (62 pages, over 200 black and white photographs and 16 line drawings.) Available from N Biggs, White House Publications, Tite Hill, Egham, Surrey, TW20 0NJ, England.

Fig. 1. Courtesy Beamish Museum
A stack of flat round Troy weights for 4, 2, 1, ½, ½ oz, the top one being knobbed.

The author tells us that "bullion is almost anything made of gold or silver, provided that its commercial value depends on its metal content alone". He details the What, Why, Who, When and (within reason) Appearance. He starts with the Romans in Britain, and spells out just how vague and bitty our knowledge is before the 15th Century. My first reaction was "How irritating to have so many *qualified* remarks", but my second reaction was "At last, an author who is not afraid to spell out how much has still to be discovered, is explicit about the areas that still need investigation, and who gives excellent pointers as to how the erratic survivals may fit into systems". This makes the book an important landmark in our knowledge of early weighing, and sets out clearly what has survived, so that all of us amateurs can feed in our little bits to add to the emerging picture. This gives me a feeling of great excitement and expectation. We too can contribute to the research.

The book is divided into seven sections up to 1853:
1. Anglo–Saxon 6th–9th century; **2**. Late Saxon and Viking 9th–11th century; **3**. Weights for payments in silver c 970–1340; **4.** Goldsmiths mediæval and Tudor; **5**. Cup–weights c 1600–1850; **6**. Pennyweights c 1600–1850; **7**. Grain weights c 1600–1850;
and seven sections after 1853:
8. Decimal troy system 1853 on; **9**. Pennyweights c 1850 on; **10**. Grain weights c 1850 on; **11**. For bulk coin before 1816; **12**. Bank weights for sovereigns 1817–1916; **13**. Bank weights for bagged coin 20th century; **14**. Bank weights for notes. The last section includes an annotated bibliography (very practical), verification marks and notes for collectors. Take any bullion weight, and it can quickly be put into its category (even if there is no illustration of that particular minor variation).

Fig. 2. Courtesy A Rangeley
A rare brass knobbed weight for 20 oz Troy.

Only one common type is missing – the classic flat round weights with raised rims for 4–1oz, ½ oz and ¼ oz Troy. See Fig. 1. These are so common that they scarcely need to be illustrated, except to be comprehensive. A few rarities are omitted, such as the shallow inverted truncated cone with a knob for the sovereigns of William IV; the cylindrical small–knobbed weights *engraved* "100 10/–"

for notes; and the tall disc with a large hook screwed into the top stamped "£1 BRONZE" and given a bronze-coloured finish over the brass. I regret the lack of a record for the latter one, as I would like to know with what kind of scale it was associated.

With Biggs' previous book on *Apothecary Weights*, it was possible to allocate a number to each weight (and likewise, a number to each monetiform coin weight using the Withers' *British Coin Weights*), so the expectation was raised that we would be able to do the same with bullion weights. Alas, Biggs proves that too many minor variations exist amongst the simple weights put out by scalemakers. He gives a few variations between numbers 2370 – 2394, 2460 – 2490, 2500 – 2509, and 2675 – 2687, but unfortunately collectors will never be able to be categorical about the simple weights. So be it, at least we know where we stand.

Fig. 3. Courtesy National Trust, Snowshill Manor.
Biggs no. 2411, "ACCORDING TO ACT OF PARLIAMENT 1775" on the 5 dwt, and 1775 on the reverse of the smaller weights. The obverse has the weight down to "TWELVE GRAINS", that being half a pennyweight. They are all firmly stamped with a crown at the Mint.

Biggs states that many silver (5/–, 2/6d, 1/– & 6d) weights date from the time of the great recoinage of silver at the end of the 17th Century. Did people say "I'll pay that 8/3 in silver coins as far as possible", get out the 5/–, the 2/6 and the 6d weights, balance them against any diminished (light) silver coins they had in their pocket, and make up the difference in coppers? Were the scale beams and cords sturdy enough? Perhaps they only went up to 5/– worth in one weighing, and dealt with any surplus in a second weighing.

Some relatively rare coin scale boxes contained a trade label giving the values and weights of the eleven gold coins current between about 1750 and 1775, but had only **bullion** weights. For example, two small shagreen boxes, one by William Brind, (shown in EQM, page 205), and one by Edward Phillips, are known. These boxes raise an interesting point. The sum of the bullion weights is 22 pwt. The sum of the coin weights for the same eleven coins would be 45 pwt. When the box was carried about in the pocket, that difference was significant. To use them, the owner did have to sort out the correct bullion weights, rather than just pop one coin weight on the pan, but, as long as the owner only expected to weigh a gold coin occasionally, he had the advantage of a lighter box.

The social significance of these bullion weights, as exemplified by the two paragraphs above, are not emphasised by Biggs. He does discuss laws, recoinage, bullion prices and stamping by inspectors very thoroughly, but he gives a slight impression that the weights existed in isolation, rather than as part of a kit of scales and weights.

For a book of only 62 pages, this is another rich source of knowledge and stimulation, of exceptional clarity and depth. Having used the two previous books in the series regularly and frequently, I fully expect to use this one just as much. I recommend it highly.

D F C–H

Readers of EQM may remember other bullion weights. See page 857, showing a 1 lb. Troy brass rectangular tapered weight with a large knob, made by DeGrave & Son, and presented to the Bureau des Poids et Mesures, Paris, in 1848. See also page 965, which shows a magnificent set of Standard Weights for 500 guineas down to a ¼ guinea, made according to the Act of 1774, for the Mint.

Bullion Scales, USA

Made by Henry Troemner of Philadelphia, from his catalogue of 1899.

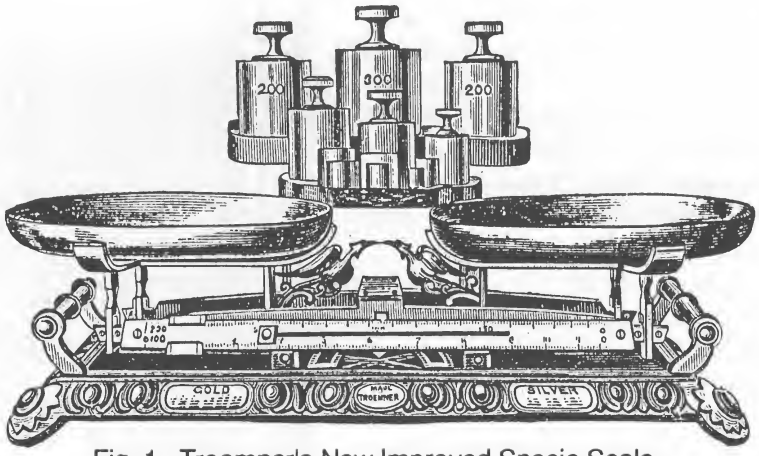


Fig. 1. Troemner's New Improved Specie Scale.

"A new and improved specie scale, designed for banks and bankers. The scale takes up but little room, and weighs with the greatest accuracy a single gold dollar up to a thousand dollars of silver at a single draft. It will verify the count, and give the actual value of abraded or the least current coin. It is provided with a full set of brass weights conveniently arranged, and a tare beam by which the amount of shortage is instantly ascertained, be it one dollar or twenty. The side beam has four graduations –for Gold, Trade dollars, Standard dollars, and subsidiary coins. On the platform of the scale are affixed two tables, one giving the weight of gold coins in drafts from 5000 dollars to 100 dollars, and the other gives the weight of silver in drafts of 1000 to 50 dollars. To weigh a draft of coin we proceed as follows: Supposing we desire to weigh $5000 in gold, we look at the table and find the weight required is 268.75; we place the 268 ounces in the right–hand pan and slide the ounce poise A to 75; then put the coin in the left–hand pan. Should the coin weigh light, we slide the poise B along the beam until the scale balances. If this takes place with the poise at say 20, it signifies that the coin is that many dollars short.

Price, complete with weights...$90.00.

All the coin scales in use at the U.S. Treasuries and the Custom Houses, are of our manufacture."

The older model Silver Scale has exposed linkages, and is a Beranger scale with a bar along the front. See Fig. 2. Were Troemner's using a Beranger linkage on the scale above? The sensitivity must have been poor.

Made by Henry Troemner of Philadelphia, from his 1899 catalogue.

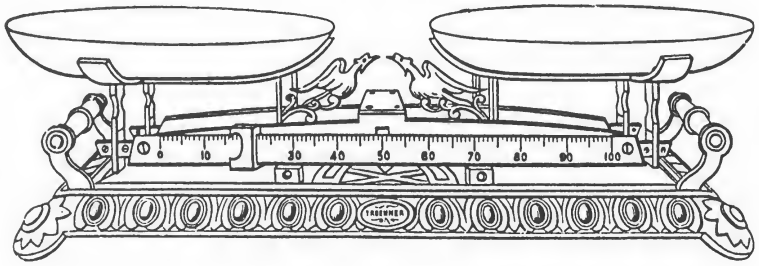


Fig. 2. ***Silver Scale.*** *A new and reliable scale, of large capacity, for weighing large or small amounts; solid silver or plated ware, or any bulky matter; has "Agate" bearings, heavy 14 in. pans; with side beam on the front, which weighs to one ounce, and is divided into 100 equal divisions, each representing the 100th part of an ounce; this saves the use of weights smaller than an ounce; scale will carry 300 ounces in each pan, and is used by Tiffany & Co., Gorham Mfg. Co., and others.*

Price (without weights)...$45.00.

Made by Herman Kohlbusch of New York, from the 1902 catalogue.

Fig. 3. ***Bankers Favorite.*** *This cut represents Bullion or Specie Balance, for silver or gold coin; has 20 in. open beam, improved raising apparatus, with rest for beam; 10 in. pans; capacity, 300 oz. in each pan; in elegant, polished mahogany glass case, front door counterpoised; made entirely of brass, finely finished and heavily lacquered; sensitive to ½ gr. Case measures 36 in. long, 35 in. high, 16 in. deep. Price includes a scoop holding $5000 gold, with counterpoise, and full set of Brass Weights (300 Troy ounces).*

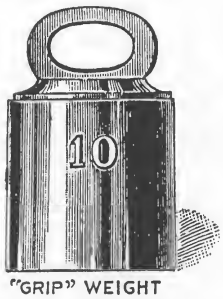
Price....$140.00.

Same scale complete as described, without Case, on platform....$120.00.

There are cheaper Scales on the market; the Scales above described are all first-class however, and will last a lifetime. In purchasing an instrument of this kind, the best ought to be chosen, you will never need to invest in one again.

Bullion Weights, USA

Made by Henry Troemner of Philadelphia, from the 1899 catalogue.



"GRIP" WEIGHT

Fig. 1. *Single Iron Troy Weights. 500 oz Troy weight....each $5.00. These are commonly used with the large Bullion Balances.*

From the 1926–1941 catalogues.

Fig. 2. *Bullion weights, Troy. Weights are of brass, coin shape, from ½ dwt. up. Below ½ dwt. (5 grains to ½ grain) wire aluminium, in cardboard boxes. Price....$2.25.*

Notes & Queries

N & Q 128	from S Camilleri

I have found 3 identical sovereign folders bearing serial numbers VIIII, III and XX, all made of paktong (nickel–alloy). Michael Crawforth found another with the serial number VIII, but he could not identify the maker. Numbers III and XX had flat round weights marked "1 SOVEREIGN J TONGUE", "½ SOVEREIGN", and a 3 grains and a 2 grains weight in the form of a crown. In the article on Birmingham scale–makers 1750–1800, EQM page 1508, William Tongue is listed. Is J Tongue a successor to William Tongue? Can we deduce that J Tongue was the maker of these distinctive folders?

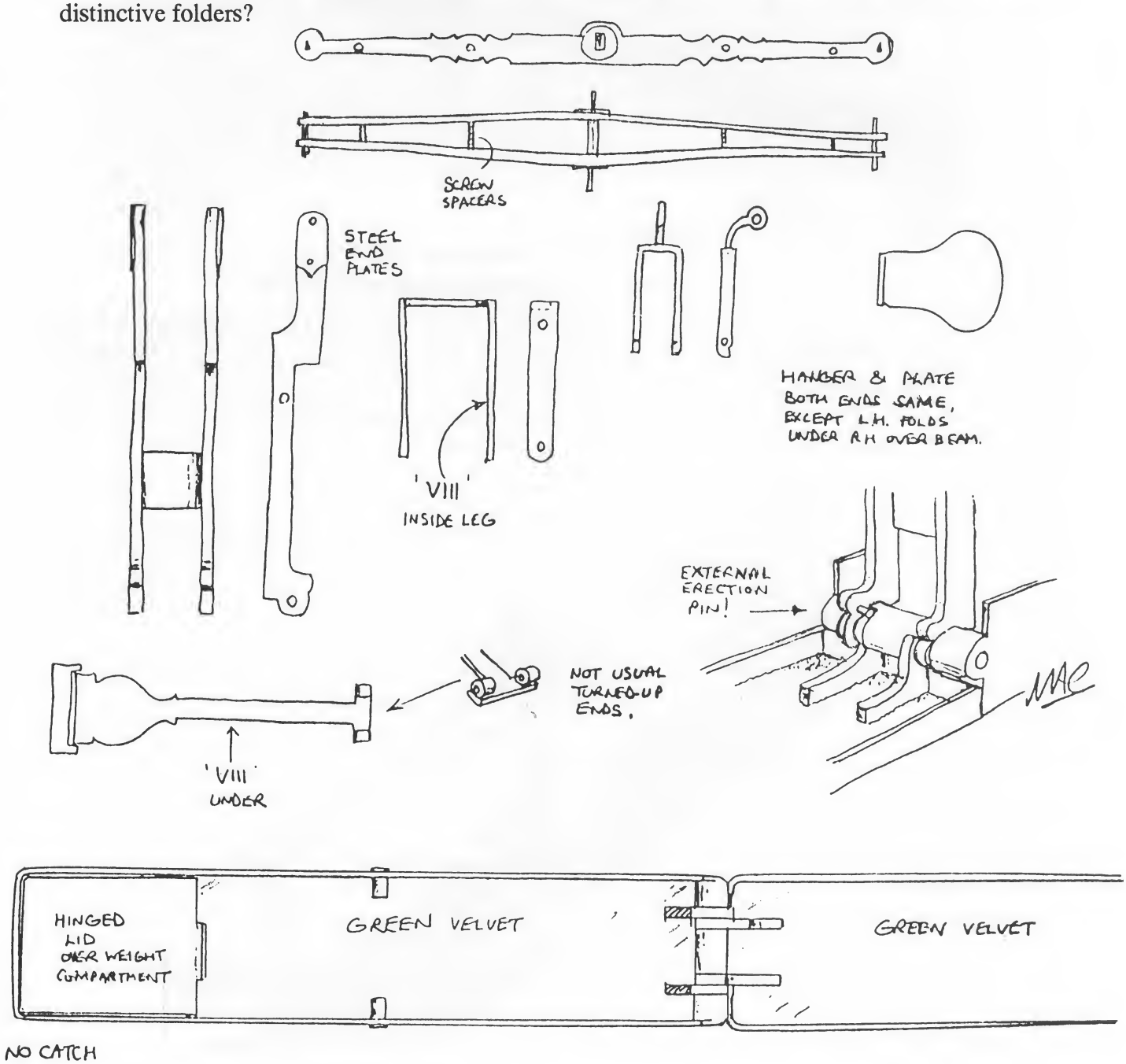


Fig. 1. Michael's sketches, done for a letter sent to Serge, of his paktong folding balance.

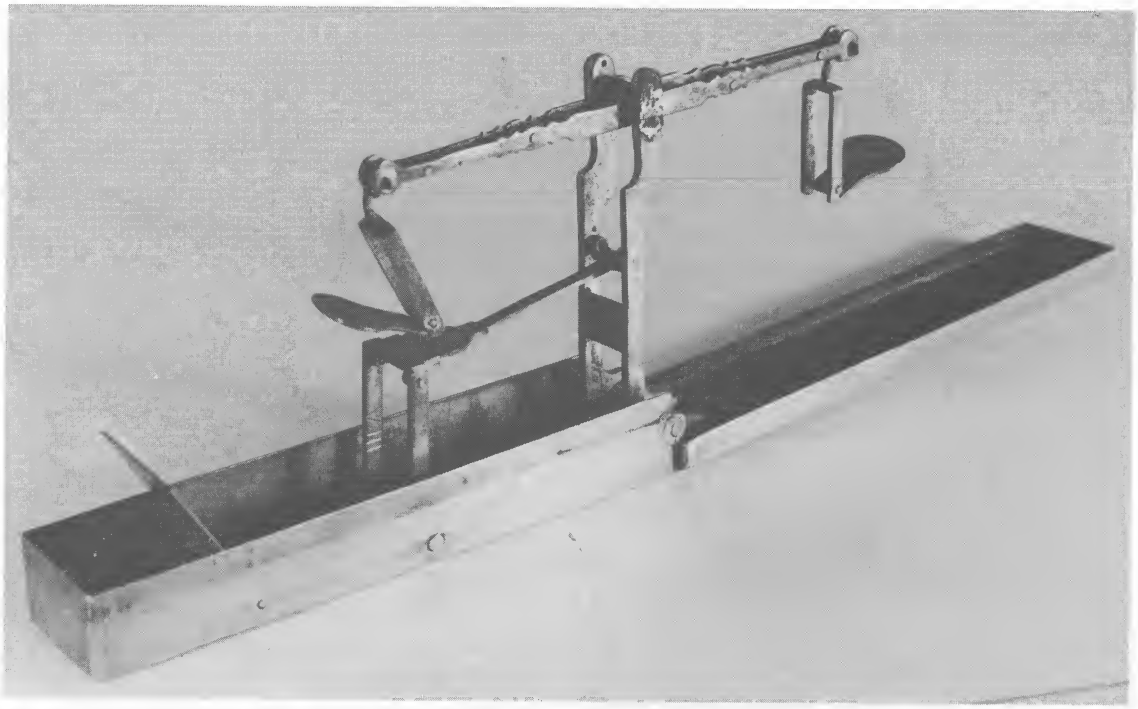


Fig. 2. Note the twin beams, the weight compartment and the deep paktong box.

Both the scales and the boxes are made of paktong, a nickel alloy used for candlesticks between about 1760–1790, and which was being used to make shelf-edge postal scales by John Greaves & Son before 1849 (the firm changed to Edward Greaves in 1849). Metal-history books say that nickel was discovered in 1750 but not used in commercial quantities until about 1880. This folder was assessed by Michael as being made around 1840.

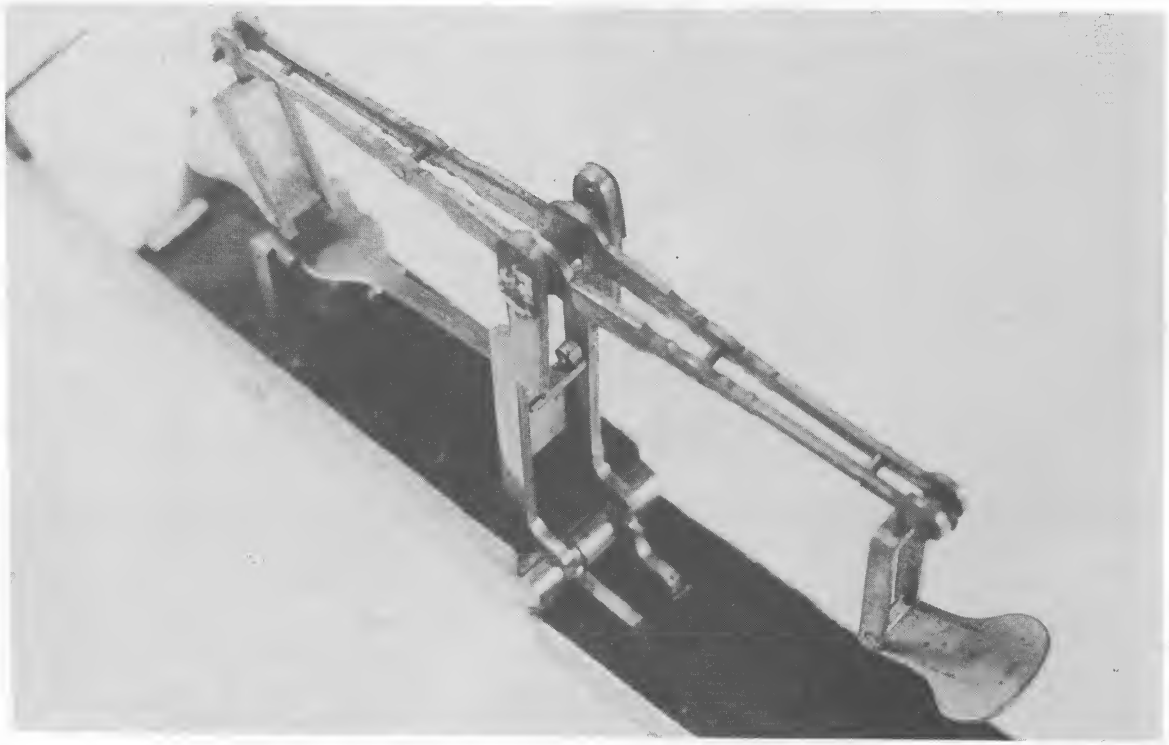


Fig. 3. The beams are held apart by little turned spindles. All parts are well-made. The box is lined with green baize, which is very unusual in a folder.

N & Q 128 reply from P Withers

William Tongue evidently bought in weights and applied his incuse stamp to them, looking at the differences between set 1713 and set 1752 in *British Coin Weights*. The first known record of William Tongue is in the 1767 Birmingham directory as Gun–lock Maker etc. at 43 Snow Hill. From 1777 to 1781 he is described as Money Scale Maker.

N & Q 128 reply from the Editor

William Tongue made a living in various ways. Here are the Directory entries that we found:

Category	Address	Directory	Date
Gun–lock maker	43, Snow Hill	Sketchleys	1767
Gun–lock maker	43, Snow Hill	Swinneys	1774
Money–scale maker	43, Snow Hill	Scarses	1777
Money–scale maker	43, Snow Hill	Pearson & Rollason	1780
Money–scale maker	43, Snow Hill	Baileys	1781
Gilt–toy maker	Livery St	Universal	1793
Gilt–toy maker	Weaman St	Pyes	1797
Toy maker	?	Bisset	1808
Gilt–toy maker *	Weaman St & Keay Hill	Triennial	1812
Steel–chain, toy & ornaments	?	Wrightsons	1815
Engineer	Bordesley St	Pigots	1816
Gilt–toy maker	22, High St	Pigots	1816
Engineer	Bordesley St	Underhills	1817
Toy dealer	22, High St	Pigots	1818
Steel–chain, toy & ornaments	22, High St	Wrightsons	1821
Gilt–toy & watch–chain maker	22, High St	Baines	1822
Japanner	22, High St	Baines	1822
Jeweller	22, High St	Baines	1822
Factor	22, High St	Baines	1822
Platers & manufacturer of plated wares	22, High St	Baines	1822
Silversmith	?	Wrightsons	1823
Factors & jewellers	20, High St	Pigots	1825

*The Triennial carried a full advertisement, *"**William Tongue**. Gilt, gold and silver toy maker at Weaman Street and Keay Hill. Silversmith, working jeweller, every description of toys. Ladies cotton boxes, gentleman's shaving cases. Warranted razors. All sorts of penknives and scissors. Ballance knives and forks, patent machine corkscrews, spoons, teapots, coffee biggins, urns, waiters, candlesticks, tea chests, writing desks, snuff boxes, essence boxes, pencil cases, assortment of children's toys, etc."*

So, he believed in advertising! But what has survived? Five loose money weights illustrated in Withers *British Coin Weights* and one oval japanned coin scale box. The box has a Chinoiserie scene painted on the lid, the pans are stamped **WT** and the £3..12 weight is stamped W TONGUE. Because the weights are the long set, they were needed before the New Standard probably, and date from before 1776. William Tongue does not mention japanning as one of his occupations until 1822, so he probably bought in the box from one of the specialised japanners.

Another small oval japanned box survives. The box is 4" long, with a lift–off lid, instead of a hinged lid. The pens are formed by a serpentine strip of metal, and contain 2 square weights for 5.8 and 2.16 (guinea and half–guinea) stamped with a large crown at the Mint in London and

matching square apothecary weights, unstamped. The 3½" beam has swan–neck ends, and has silver pans stamped WT, (no siver marks were required on items weighing less than ½ oz). Presumably this box was also made by William Tongue, but after the New Standard of 1776.

N & Q 128	from A Rangeley

John Tongue is in Pigot's Directory of 1835, at 24, Summer Row Birmingham, as silversmith, pencil case, knife, snuff box and thimble maker. I have a sovereign weight and a half–sovereign weight stamped "J TONGUE". See Fig. 4.

Fig. 4.
Sovereign weight by J"TONGUE
5 DWT " 2½ GR.

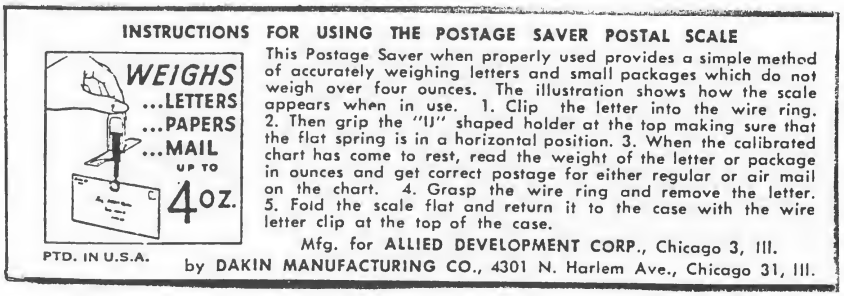
Half–sovereign 2 DWT 13⅛ GR.

N & Q 128	conclusions

No direct evidence unites William and John Tongue, and their working lives seem to have started 68 years apart, but they did make similar products. So many men in Birmingham made small objects that it would be difficult to argue that John was a descendant of William's without more evidence.

However, I would consider that John Tongue made these folders, unless some new evidence contradicts this evidence that you have supplied. We now need more evidence that John Tongue worked in paktong, so I will consult a member of the Antique Metalware Society who is researching users of paktong. The material was so rarely used that it should be possible to pick out his work, especially if he stamped it with his name! Paktong objects looked just like silver for many years after they were manufactured, only developing a slight yellowy oxide very gradually. If cleaned, they continued to look like silver.

Old Advert



ISASC

EQUILIBRIUM®

QUARTERLY MAGAZINE OF THE INTERNATIONAL SOCIETY OF ANTIQUE SCALE COLLECTORS

1995—ISSUE NO. 4 PAGES 1945-1972

Cover Picture

Top kitchen weighing scoop:
The Duplex Handy Scale, Patent no. 735559, Reg. Design no. 874862, Made in England, Foreign Pat. Pending. Capacity 8 oz. White plastic, with red taring screw. The reverse of the casing had "FOR CORRECT WEIGHING **HOLD LEVEL**. POINTER MUST BE AT ZERO WHEN EMPTY. ADJUST WITH SCREW." Length 13½ ins (335 mm.)

Bottom kitchen weighing scoop:
Praktik Product Scadle, U.S.T.M. Reg.-Pat. Pend. Made in Austria. Capacity 8 oz and 230 gramm. Aluminium scoop scored with three rings, the lowest marked ¼, the middle ring ½, the upper ring ¾, and next to the top edge 1 CUP. On the covering is a decal (transfer) stating "HOLD HORIZONTALLY! When ladle empty - band must point to 0: otherwise loosen ring-screw and move scale sideways." On experimenting, the screw proved to go through the cover into a threaded hole in the aluminium handle. If the cover and mechanism was then moved sideways, the screw no longer lined-up with the threaded hole, and the whole connection was unstable! Not engineeringly sound! Length 12 ins (300 mm.)

See pages 1964-1966, for the next part of the article on Flexure Spring Scales.

See page 765, 773 and 774 for other varieties of kitchen scoops working on different principles.

INTERNATIONAL SOCIETY OF ANTIQUE SCALE COLLECTORS

Founded September, 1976

176 West Adams St.* Suite 1706 * Chicago, IL 60603 * USA * Tel. 312/263-7500

EQUILIBRIUM is published quarterly in January, April, July and October.

Editor--Diana Crawforth-Hitchins, 15 Hawthorn Ave., Headington, Oxford OX3 9JQ, England.

Associate Editor--Ruth Hendricks Willard, P.O. Box 27565, San Francisco, CA 94127, USA.

ISSN-0893-2883

Aaron David Bernstein's Apparatus for Sorting Coins

By J LINDNER

1 The Announcement of the Apparatus

In the *Deutscher Reichsanzeiger und Königlich Preußischer Staatsanzeiger* no. 238 of 9 Oct 1876, the following advertisement appeared:

Induſtrielle Etabliſſements, Fabriken und Großhandel.

[8194] **Bernstein's Patent-Münzprüfer.**

Wir zeigen hierdurch ergebenſt an, daß wir jetzt in umfangreicher Weiſe mit Fabrikation obiger Apparate, **welche ſelbſtthätig gefälſchte und nicht vollwichtige Goldſtücke ausſcheiden,** begonnen haben.

Den Verkauf dieſer Apparate hat die Firma: (à Cto. 54/10.)

Jacob Ravené Söhne & Co., Wallſtraße 93, hier,

übernommen, welche eine Anzahl derſelben ausgeſtellt hat und zu näherer Auskunft gern bereit iſt. Auch ſtehen die Münzprüfer in unſerm Detailgeſchäft, Markgrafenſtraße 50, hier, zum Verkauf.

Berlin, Oktober 1876. **Alex Bernstein & Co.**

The same advertisement appeared between the 7th and 10th Oct 1876 in most of the daily papers of Berlin and in some provincial papers.

On the evening of the 4th Oct 1876 these coin testers were demonstrated to the Association *Berliner Presse* and most of the newspapers in Berlin reported some of the details. From the many reports is cited (in translation) the commentary of the *Norddeutsche Allgemeine Zeitung* of the 7th Oct 1876, because a better description cannot be imagined and, besides, one can see the interest generated by these objects:

New Gold Balances

On Wednesday Mr A Bernstein demonstrated two examples of his newly invented gold balances of different construction, and gave an explanatory lecture about them, to the Association *Berliner Presse*. The new gold-standard compels all circles engaged in trade to desire an instrument by which gold coins can be easily tested for the standard of gold. In England a machine was constructed a long time ago, and acquired by the Bank of England, which separates false or light coins. [24] The Bank of Prussia has acquired the same apparatus, which is extremely ingeniously constructed, but costs over 1700 Thalers. Bernstein endeavoured to invent an instrument with a sensitivity as great as possible, yet so simply constructed that it is cheap to manufacture, enabling each businessman to obtain this requisite so necessary for monetary transactions. This problem has been solved by this inventive man in a highly satisfactory manner. A Bernstein presented to the members of the Association two little instruments which his son **Alexander Bernstein** has executed accurately and solidly. The smaller instrument is produced only for businessmen who have got neither time nor desire to use a gold balance to weigh each gold coin. This takes too much time and makes the customers angry because such checks imply mistrust. Using this apparatus, the check can be made without using a balance. The merchant simply throws the received gold coin into the slot which leads through the mechanism to the cash-box. If the gold coin is genuine and is heavy enough, it will roll into the cash-box but if it is false or has got a deficit then the apparatus will reject it immediately. This small machine is based on the principle of the seesaw and is extraordinarily ingeniously and simply constructed, checking and eliminating as quickly as one can throw in the coins. The tests have been passed brilliantly. However, the apparatus is not sensitive enough to detect very small deficits. Therefore Bernstein has constructed for the use of bankers and big-businessmen a much more sensitive but obviously more complicated machine, which detects a deficit of ten centigrammes of an eight-gramme gold coin, and which rejects coins damaged by aqua-regis or other methods. Just because this apparatus tests as fast as a hand throws the coins into a till, the customer only then realises that he has paid with counterfeit or unduly light coin. Likewise the experiments demonstrated with this apparatus have been passed brilliantly; undoubtedly, these newly-patented inventions of A Bernstein's satisfy a universal need in the best manner. The expediency jumps to the eye of each businessman with a till or each banker or each exchange-office which has got a counter. But the simplicity of the construction makes possible the most solid construction at the lowest price. The patented machines which have been inspected by the Association were made scrupulously, cleanly and were stable.

The *Königlich privilegirte Berlinische Zeitung (Vossische Zeitung)* of the 6th and 11th Oct 1876 give the prices. The smaller instrument should cost about 45 Marks and the larger 75 Marks, but the *Berliner Börsenzeitung* of the 6th Oct 1876 points out that *"the price would be lower if the invention, so important for world-trade, became better known"*.

At the sitting of the Association *Verein zur Beförderung des Gewerbefleiße* in Berlin four weeks later, on the 6th Nov 1876, Aaron David Bernstein's son Alex (see section 3) reported details

about the importance and the way of functioning of this apparatus. The engineer A[lex] Bernstein had been a member of this association since 1st Jan 1873. His report is printed in the IX supplement (page LXXXII) of the *Verhandlungen des Vereins zur Beförderung des Gewerbefleißes 1876*. It is not quoted because it is the equivalent of the newspaper article above, and of the later specification in the British Letters Patent no 1351, (see section 3).

2 Aaron David Bernstein

Who was Aaron David Bernstein? Hardly any of our contemporaries today know his name, and only the name of his son Alex is known to us through his counterfeit coin detector that the user held in his fingers, with the inscription GOLDMÜNZWAAGE / ALEX BERNSTEIN & C°. / BERLIN or only BERNSTEIN'S PATENT. Nevertheless Aaron David Bernstein was so important in his day that he is entered in the newest German encyclopædias, including *Meyer* 1971, *Brockhaus* 1987, in the 11th edition of *Encyclopædia Britannica*, 1910, in the *Universal Jewish Encyclopædia* (New York 1948), in the *Encyclopædia Judaica* (Jerusalem 1971) and in most universal biographies. But even in recent times (1992) a book about his life-history and importance has been published in Germany. [1 and 2]

Aaron David Bernstein was born in Danzig on the 6th April 1812. As the eldest son he was supposed to become a rabbi according to the traditions of his family. For several years he attended a school for rabbis in Fordon in West-Prussia then went, without becoming a rabbi, to Berlin in 1832 in order to follow his literary tendencies.[3]

His first literary works he sent under the pseudonym *Rebenstein* to the famous novelist and publisher Willibald Alexis (Häring), who soon realised his talent and introduced him to the circle of literati in Berlin. [4] At this time he wrote several much-noted short novels and was beginning to be busy with natural scientific studies.

The first result was an article, the *Rotation of the Planets*, which gained him the acquaintance of and enduring contact with the astronomer Bessel. [4] Religious problems moved the former student of the Talmud further on, and by 1845 he had joined the founders of the Jewish Reform-Community in Berlin, which group intended to radically remodel the traditional forms of Judaism to make a modern religion. Their members believed wholly in their German-ness and felt that only their religion distinguished them from their fellow-citizens of other faiths. [1 and 5]

In 1848 Aaron David Bernstein participated actively in the revolution in Berlin, and under its influence, he founded the *Urwähler-Zeitung, Organ für Jedermann aus dem Volke*. Using this paper - the first number was published under his editorship on 29th March 1849 - he made it his mission to clarify for the people their rights of liberty and democracy, and also the resulting obligations. [6] Because of his articles, the newspaper was confiscated several times and Bernstein was punished with fines and imprisonment. In March 1853 the *Urwählerzeitung* was closed down by the police, but a few days later it was resurrected by the publisher Franz Duncker under the new name *Volks-Zeitung*, with the same aims. For this paper, Bernstein wrote, almost without interruptions, all the daily leading articles. [1 and 4]

But more significant than these ephemeral articles were the contributions on natural science which he published weekly in the *Volks-Zeitung* in which he gave the results of practical scientific experiments, which he, a self-educated person, made popular. He had the ability to explain the most complicated problems so clearly that everybody was able to understand them, [4] and contributed significantly to the expansion of his paper and to his own fame.

The collected essays have been gradually published under the name *Naturwissenschaftliche Volksbücher*; [4] there are several new editions and they have been translated into other languages too. The last (5th) edition of 1899 consists of 21 volumes of, altogether, 2816 pages. [7] For these achievements he was awarded, with eight other people, on the 10th Aug 1877, a honorary doctorate of the natural science faculty (Dr. rer. nat. h.c.) of the university of Tübingen on the occasion of the 400th anniversary of this university. [8 and 9]

As a consequence of his studies in natural science he applied for patents for a considerable quantity of inventions. He was one of the first to solve a problem of telegraphy, to transport several telegrams through one wire: [4] he patented this invention in 1855 and 1856 in Great Britain and Ireland, Austria and Prussia. In 1857 he got another patent in Prussia for *A communicator key for telegraphic purposes.*

In almost all the biographies about Bernstein it is said that he invented an automatic safeguard for railway crossings, but this is presumably a mistake, as he never had such a patent; on the other hand, his son Alex Bernstein's second patent in 1872 was for *An electro-pneumatic contact alarm for signalling the passage of a railway train at a given spot.*

Aaron applied for patents for his third invention for *An Apparatus for Assorting Coins* in no less than 25 states in 1876 (see section 3); the twenty-sixth and last patent of this invention was for the *Deutsches Reichpatent* no 7253 of 1879 (see section 4).

Following this were eight patents between 1877 and 1880 for *Improvements in apparatus for testing inflammable liquids* (Austria, Belgium, Canada, France, Germany, Great Britain and Ireland, Italy and the USA), and lastly, in 1882/1883 in the same eight countries, patents for *Improvements in galvanic elements.*

Aaron David Bernstein died on the 12th Feb 1884 in Groß-Lichterfelde near Berlin and was laid to rest on 15th Feb in the Jewish cemetery in the Schönhauser Allee (today this is a district of Berlin, Prenzlauer Berg) with great sympathy from the public and from the representatives of public life. [5 and 10]

3 The patents for the counterfeit coin detector

Aaron David Bernstein was always aware of technical problems and he tried to solve them. His interest in counterfeit coin detectors was presumably stimulated by the reports of his son Alex on the model of a gold balance, "*by which the correct weight and size of the new Reichsgold-coins (Crowns and Double-crowns) can be tested easily and quickly*", which the director of the *Königl. Gewerbeakademie Berlin*, Prof. Reuleaux, had demonstrated to the April meeting in 1875 of the *Verein zur Beförderung des Gewerbefleißes in Preußen*; [11] Alex was at that time a member of the technical committee, department for mathematics and mechanics, of that association.

It is not known whether that gold balance was one of the first examples of Alex's work or of another mechanic; in any case it stimulated his father Aaron to invent his apparatus. The practical execution of his invention was no problem for him, because his son Alex had a factory for weighing machines in Berlin, which was registered in the Register of Firms in Berlin on 18th Nov 1871. [12]

Alex Bernstein will be discussed in a future article; correctly, his first name was Alexis, but from childhood he was mostly called Alex, [9 and 13] and later, often called Alexander (as for example in the newspaper report quoted in section 1).

Aaron invented a counterfeit coin detector based on the principle of the rocker, but without the problems of the usual rockers, because in his invention the coin was weighed during its rolling movement, so that the whole mass of the coin was always pressing on one point, and the unequal distribution of the mass of the decorative design was nullified. The remaining inaccuracies of his coin tester result only from the mechanical inadequacies of the manufacture and from friction.

Most of the twenty-five patent-specifications of this coin-tester are still preserved in state-archives or patent-offices. The following list gives their dates and the means by which they may be found. The numbers given are, as a rule, the numbers in the patent lists and they are not always the numbers of the patent itself. The identifying point is the date. The underlined numbers are demonstrably real patent numbers.

State	Number	Date	Duration
Great Britain & Ireland	1351	29 March 1876	3 years
Prussia [15]	IV-4671	30 March 1876	3 years
France	112,152	30 March 1876	15 years
Belgium	39,306	10 April 1876	?
Saxony (Kingdom)	124	15 April 1876	5 years
Saxe-Weimar	9	10 May 1876	5 years
Saxe-Meiningen	8	13 May 1876	31. 12. 1880
Lippe	4	15 May 1876	5 years
Reuss Younger Line	6	15 May 1876	5 years
Coburg and Gotha	12	16 May 1876	5 years
Saxe-Altenburg	10	16 May 1876	5 years
Schaumburg-Lippe	4	16 May 1876	5 years
Wurtemberg	-	17 May 1876	5 years
Anhalt	-	18 May 1876	3 years
Oldenburg	12	20 May 1876	5 years
Schwarzburg-Sondershausen	-	23 May 1876	5 years
Reuss Elder Line	5	29 May 1876	5 years
Schwarzburg-Rudolstadt	6	29 May 1876	5 years
Austria	7	14 June 1876	1 year
Waldeck and Pyrmont	3	19 June 1876	5 years
Brunswick	22	23 June 1876	5 years
Bavaria	96	24 June 1876	5 years
Baden	81	7 July 1876	3 years
Hesse	30	13 July 1876	3 years
United States of America [23]	183,833	9 Sept 1876	?

For each of the patents the specification and drawings had to be repeated by hand. Most of them have not been published so each set is unique; each of them is an independent patent in which the text is not always the same. One can imagine the importance which the inventor attributed to his invention, judging by the effort and money he invested in it. Presumably the reason for it was not so much Aaron David Bernstein as his son Alex and his firm.

The author has seen only the first three of the patent specifications, those of Great Britain, Prussia and France. The texts of these three specifications are approximately in agreement with each other, and the drawings are virtually the same, but drawn specifically for each application. A discussion of these patents is superfluous because the drawings are essentially the same as the British patent no 1351 of 1876, and the technical description of the apparatus is accurate, excepting a small modification in the French and the Prussian [15] specifications, which typifies the electromagnetic interests of Aaron David Bernstein. In the following, this modification is translated from the Prussian specification:

".....Because I think that such an apparatus, exactly wrought, gives sufficient safeguards against counterfeit gold coins in daily use, I wish to add a modification for finer discrimination, which eliminates each disturbance of the sensitivity by friction of the vane-shaped switch d in its axis.

For fine sorting the apparatus is arranged so that the vane is not in mechanical contact with the rocker; rather, it uses an electromagnet to trigger the motion of the vane as soon as there is the slightest deviation of the rocker out of its normal position.

For this purpose the electrical power of a constant current shall circulate through a conducting connection between the normal position of the short end of the rocker and the rocker itself, and by that a short circuit in the current can be caused. A second current goes through the coils of an electromagnet producing a corresponding resistance, the force of which is cancelled by the short circuit. As soon as a gold piece of full value disturbs the rocker even the smallest amount, the contact will be broken and the power flowing through the electromagnetic coil will cause the vane to direct the run of the gold coin.

By this separation of the motion of the vane from the motion of the rocker, the accuracy of the separation of the various gold pieces is nearly equal to that achieved by good gold balances, as long as the counterpoise is correctly positioned, the prisms are precise and the rocker is truly level."

It is presumed that this modification was not manufactured or proved not to work, as it was not incorporated into the *Deutsches Reichspatent* three years later (see section 4).

Representing all the patents is the British patent no 1351, which was applied for by Alfred Vincent Newton, of an Office for Patents, 66, Chancery Lane, London, on behalf of Aaron David Bernstein of Berlin, on 29th March 1876. It was granted on 9th Sept. 1876, but became void *"by reason of the Non-payment of the additional Stamp Duty of £50, before the Expiration of the Third Year, for the week ending the 29th day of March, 1879"*; [14]

A.D. 1876, *29th March.* N° 1351.

Apparatus for Assorting Coin.

LETTERS PATENT to Alfred Vincent Newton, of the Office for Patents, 66, Chancery Lane, in the County of Middlesex, Mechanical Draughtsman, for the Invention of "IMPROVED APPARATUS FOR ASSORTING COIN." A communication from abroad by Aron Bernstein, of Berlin, in the Kingdom of Prussia, Editor.

Sealed the 9th September 1876, and dated the 29th March 1876.

SPECIFICATION in pursuance of the conditions of the Letters Patent filed by the said Alfred Vincent Newton in the Great Seal Patent Office on the 27th September 1876.

ALFRED VINCENT NEWTON, of the Office for Patents, 66, Chancery Lane, in the County of Middlesex, Mechanical Draughtsman. "IMPROVED APPARATUS FOR ASSORTING COIN." A communication from abroad by Aron Bernstein, of Berlin, in the Kingdom of Prussia, Editor. 5

This Invention relates to a novel arrangement of mechanism for separating coins of standard weight and size from light or false coins of the same nominal value in a rapid and efficient manner. To this end suppose the apparatus to be made for assorting sovereigns, an inclined passage provided with a gauged entrance is used to pass down that coin when made of standard gold; the gauge will, however, reject any coin of undue thickness. The coins, as they leave this inclined guide, roll on to the raised end of a counterweighted rocking frame or table and meet a switch, which directs them into one of two receiving chambers provided the one to receive the coins of standard weight and the other those of light weight.

When the coin is of full weight it will depress the rocking frame, but when light the counterweight will maintain the frame in its elevated position.

The switch which guides the coins into their respective receptacles is carried by a vertical spindle, which is so connected to the rocking frame that when that frame is depressed the switch will be turned so as to direct the coin into the receptacle for full-weighted sovereigns. When, however, a light sovereign is received on to the rocking frame, no motion of the frame or switch will take place, and the coin will therefore pass to the receptacle for light sovereigns.

In the accompanying Drawing, Fig. 1 is a sectional plan view of the assorting apparatus; Fig. 2 is a longitudinal section, taken in the line 1, 2, of Fig. 1; and Fig. 3 is a transverse vertical section, taken in the line 3, 4, of Fig. 1. In these Figures A is an external case enclosing the apparatus, and provided with a transverse partition A^1, on one side of which the assorting apparatus is situate, the space on the other side being intended for the reception of the assorted coins.

a is a framing of cast metal made fast to the bottom of the box A, and carrying on its upper surface steel supports for a counterweighted rocking frame *b*, fitted like the beam of a balance with V or knife edges on which to rock.

The counterweight b^1 of this frame may be made adjustable to suit coins of different denomination, and the vibration of the frame is limited by means of stops on an adjusting screw b^2 (see Fig. 3), which screw passes through the weighted end of the rocking frame, and is supported in brackets affixed to the side of the box A.

c is an inclined guide made fast to the framing *a*, and set at right angles to and terminating in the plane of the free or front end of the rocking frame. The upper end of this guide *c* forms or is fitted with a gauge, which will allow a coin of the standard size to pass through it edgewise, but will prevent the passage of any of larger dimensions.

The coin which has passed the gauge will roll down the inclined guide, and on leaving the guide will be received on to the rocking frame *b*, and rolling across that frame it will meet a vane-shaped switch *d*, the object of which is to direct its course into one or other of two receptacles *e* and *f*, the former of which receives the sterling coin of full weight, and the latter the light and the spurious coin. This switch *d* is mounted on a vertical spindle d^1, which has its bearings in the framing *a*. At the lower end of this vertical spindle is a short arm *d*, which is connected by a horizontal rod d^3 with an arm d^4 keyed to and pendent from a b^3 rod mast fast to the rocking frame *b*.

When the coin that reaches the rocking frame *b* is of full weight it will depress that frame, and the switch *d*, by reason of its connection with the frame *b*, will be moved to the dotted position of Fig. 1. The coin will, therefore, in passing off the frame be directed into the receiver *e*; but if the coin is of light weight it will fail to depress the counterweighted frame *b*, and as no motion will be communicated to the switch, the switch will by retaining its normal position direct the course of the coin into the receiver *f*.

To ensure this assorting action the receiver *e* is brought into communication with the rocking frame by means of a fixed guide *g*, through the centre of which the switch spindle d^1 projects. In rear of this spindle is a curved guide *h*, which communicates with the receiver *f*, and it is along this guide *h* that the light and spurious coins after passing the switch *d* roll to reach their proper receptacle.

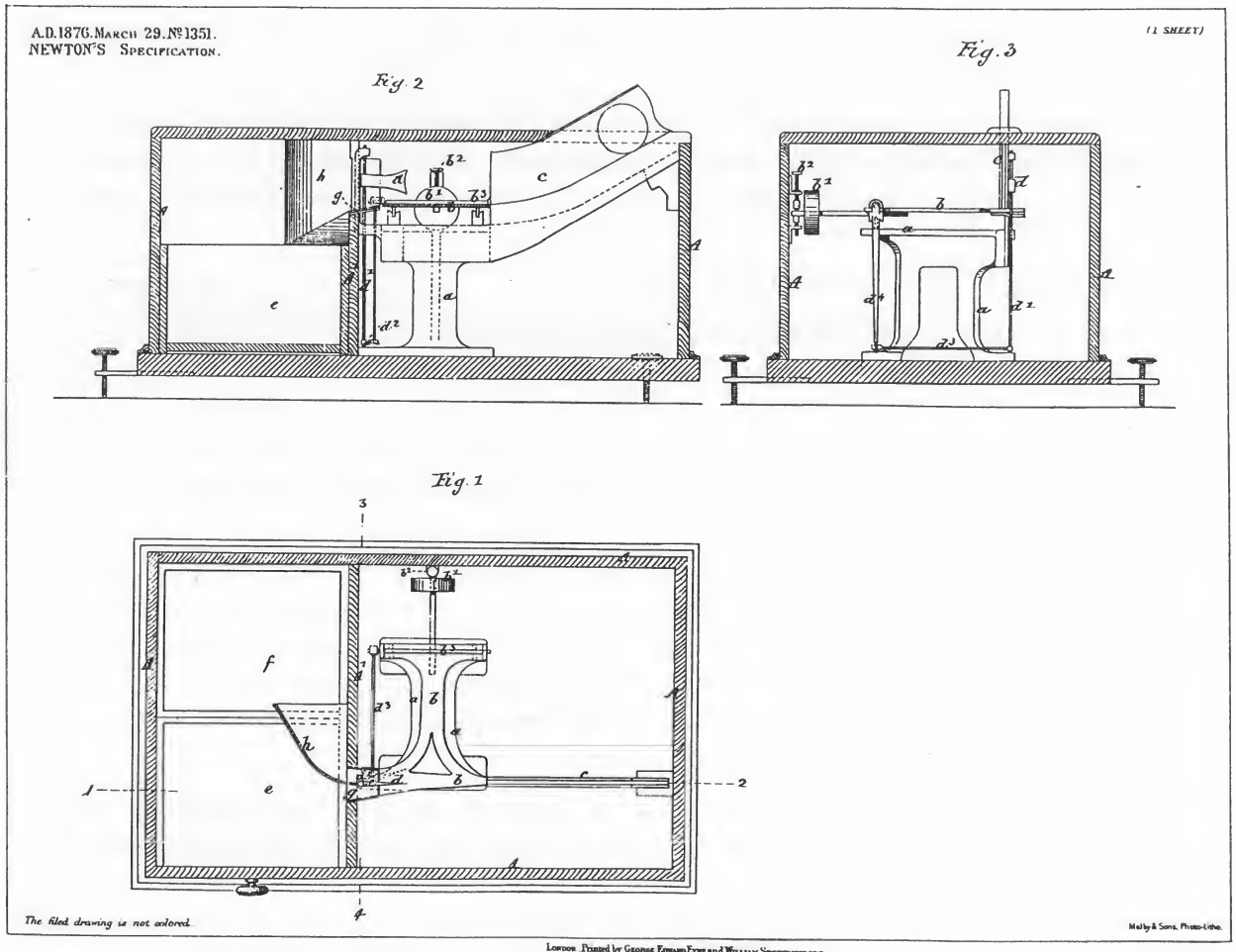
Having now set forth the nature of the Invention of "Improved Apparatus for Assorting Coin," as communicated to me by my foreign correspondent, and explained the manner of carrying the same into effect, I wish it to be understood that under the above in part recited Letters Patent I claim the arrangement of apparatus for gauging the size and testing the weight of coins, as and for the purpose above described.

In witness, whereof, I, the said Alfred Vincent Newton, have hereunto set my hand and seal, the Twenty-fifth day of September, in the year of our Lord One thousand eight hundred and seventy-six.

A. V. NEWTON. (L.S.)

LONDON: Printed by GEORGE EDWARD EYRE and WILLIAM SPOTTISWOODE,
Printers to the Queen's most Excellent Majesty. 1876.

[*Price* 6*d.*]



4 The *Deutsches Reichspatent* (Changed-Patent)

The German Patent Law of 25th May 1877 became effective on the 1st July 1877. Segment 5 related to the existing patents, which had been based on the earlier patent laws of the German states. [16] According to sections 41 to 44 of this law, the owner of an existing patent was able to extend a patent in accordance with the new Patent Laws. To achieve this, a new application had to be made, which could be shorter or an expanded version of the original patent. The granting of the new patent nullified all previous patents in the German States and only the new patent, under the new Patent Laws, was valid. But because the inventions were not new, the starting date for the run of 15 years' protection was taken from the starting date of the earliest of the previous patents. These patents were called "Changed-Patents", although they were really backdated new patents.

The earliest German patent for Aaron David Bernstein's coin tester was his patent from the Kingdom of Prussia no IV-4671 of the 30th March 1876. [15] Because this patent was granted for three years and ended on the 29th March 1879, [17] he could apply at any time up to the expiry date for his extension. He applied just in time:- on 29th March 1879. [18] The new patent was sealed on the 30th March 1879 backdated to run from 30th March 1876 for 15 years and was enrolled in the Roll of Patents under no 7253. [19]

The patent became void on 23rd Oct 1879, because the fee of 150 Marks was not paid to cover the fourth year. [20] Possibly the two Bernsteins decided not to invest more money in this patent because Alex Bernstein retired on 15th Jan 1878 from the firm that he had founded. The firm

continued, run by his former partner, under its old name *Alex Bernstein & Co.* Additionally, Alex Bernstein planned to go to the USA in 1880.

The specification and the drawing of the *Deutsches Reichspatent* no 7253 are very similar to the British patent specification no 1351 shown in section 3. It is shown in the magazine of the German Scale-collectors' Society *Maß und Gewicht* no 30, published in June 1994, pages 706 and 707.

5 Evidence for the existence of the apparatus

In spite of much research and many advertisements in the magazine *Maß und Gewicht* it has been impossible to find one of these machines and get a photograph of it. Therefore it is impossible to show a picture of it. Presumably the coin-testers were similar to the drawings of the patent, because the drawings did not change over the three years of patent applications up to the *Deutsches Reichspatent.* The Prussian patent of 30th March 1876 gives dimensions of about 26 cm long, 16 cm wide and 11 cm high.

From the advertisement reproduced in section 1 and in the publicity campaigns it is obvious that a great many of these testers were made and sold. For each of the campaigns they were produced, and even submitted by the firm Jacob Ravené Söhne & Co. to the Ministry of Finance in Berlin on 15th Sept 1876. They sent two testers for examination *"of which one guided coins of standard weight into an opening in the box beside the apparatus, and the other guided the accurate gold coins into a box beneath the apparatus".*

The report of the Royal Commission on Coinage in Berlin on 6th Oct 1876 stated that the coin-tester was a sorting scale which detected, on examination, to an accuracy of 120 milligrammes, so *"its utilisation by banks for checking the double-crown would not be recommended, and they could not be used at the mints either, because the limit of wear on the double-crown is exceeded at 40 milligrammes*". However, at the end, the report conceded *"It can be recommended because it is cheap, it is easy to transport and because it sorts light and heavy coins automatically by merely putting the gold pieces into an opening without any other manipulation."* [21] Until then it had not been suggested for the use of banks or the Royal Mint, but only for the advantage of the business world, and that is exactly what the report confirmed.

The success of the *Patent-Münzprüfer* of Aaron David Bernstein is emphasised by the petition of the merchant Eugen Bierstedt on the 18th Jan 1879 to the German Imperial Patent Office, requesting them to declare void the *Deutsches Reichspatent* no 299 for a similar *Münzen-Sichtvorrichtung* by August Reitze. Eugen Bierstedt was, from 1882 to 1884, the owner of *Alex Bernstein & Co.* the weighing-machine factory, and presumably represented the firm before he became the owner. He presented his petition during the preparations for the "Changed-Patent" presumably because of the threat of the competition. The patent of A Reitze became void, and this was upheld by the German *Reichsgericht*, the Court of Appeal. (See EQM, page 1177-1181). [22] The date of the petition implies that the coin testers of Aaron David Bernstein were being made at the least for the three years of their protection by patent - from 1876 to 1879.

The remaining wish is that soon one of these interesting testers will appear and that a photograph can complete the evidence.

Sources and References

1...Schoeps, Julius H, Aron Bernstein– ein liberaler Volksaufklärer, Schriftsteller und Religionsreformer, *Zeitschrift für Religions–und Geistesgeschichte,* issue 3, 1976.

2...Schoeps, Julius H, Bürgerliche Aufklärung und liberales Freiheitsdenken: A Bernstein in seiner Zeit, *Burg Verlag,* Stuttgart, Bonn, 1st edition, 1992, 319 pages.

3...Bernstein, Edward, *Von 1850 bis 1872, Kindheit und Jugendjahre,* Berlin 1926.

4...*Volks-Zeitung*, Organ für Jedermann aus dem Volke, no 37, 13 Feb 1884.

5...*Volks-Zeitung,* Organ für Jedermann aus dem Volke, no 40, 16 Feb 1884.

6...*Volks-Zeitung,* Organ für Jedermann aus dem Volke, no 41, 17 Feb 1884.

7...*Gesamtverzeichnis des deutschsprachigen Schrifttums (GV) 1700-1910,* volume 13, München, New York, London, Paris, 1980.

8...*Eberhard-Karls-Universität Tübingen*, Archives of University, information from 1 Sept 1987.

9...Bernstein, Johanna, *Zum hundertjährigen Geburtstag Eures Großvaters A Bernstein,* printed by H S Hermann in Berlin, no year specified.
I am very grateful to Professor Dr. Julius H Schoeps of Berlin for a copy of this.

10..*Vossische Zeitung,* no 79, 16 Feb 1884, first supplement.

11..*Verhandlungen des Vereins zur Beförderung des Gewerbefleißes in Preußen,* 54, 1875, p 48.

12..*Deutscher Reichsanzeiger*, no 175, 21 Nov 1871.

13..Bernstein, Julius, *Erinnerungen an das elterliche Haus,* Halle a S, spring 1913.

14..*The Commissioners of Patents' Journal:* 1876, pp 771 and 2153.
1879, Vol 1, p 830.

15..*Geheimes Staatsarchiv Preußischer Kulturbesitz,* 14195 Berlin, Archivstraße 12-14, Rep 120, Techn Dep Schriften, B 150/151.

16..Law of Patent, *Reichsgesetzblatt* , no 23, 30 May 1877, p 501.

17..*Deutscher Reichsanzeiger,* no 80, 1 April 1876.

18..*Deutscher Reichsanzeiger,* no 100, 29 April 1879. no 10153.

19..*Deutscher Reichsanzeiger,* no 187, 12 Aug 1879.

20..*Deutscher Reichsanzeiger,* no 286, 5 Dec 1879.

21..*Geheimes Staatsarchiv Preußischer Kulturbesitz, 14195 Berlin, Archivstr. 12-14.* Rep 183 A no 829, Tit II, no 34 for 1825 to 1901, vol I, pp 154 and 155.
The author thanks Mr Karl Otto Mittelstenscheid of Berlin for copies of these documents.

22..Lindner, Johannes, Die Geschichte der .Patentirten Reitze'schen Münzprüter., *Maß und Gewicht,* pp 90-101.

23..The USA patent was discussed in EQM, p 842. It was applied for 9 Sept 1874 and granted on 13th Oct 1876.

24..See EQM pages 1962 and 1963 for William Cotton's Sorting Machine.

Local Verification Marks:

By N BIGGS

The Administrative Background PART THREE -- the mid-19th century

County police forces

The skeletal system of law enforcement which grew up in the centuries before the nineteenth has already been mentioned. There was a High Constable for each hundred, supported by a constable for each parish or manor. But these were unpaid or part-time officials, and in the reforming 1830's a more professional form of policing began to emerge.

The Municipal Corporations Act of 1835 required boroughs to appoint a Watch Committee, which in turn appointed a number of constables. This provision was extended to counties by the County Police Act of 1839, which allowed each county to set up a Police Force. In the following year another Act allowed the amalgamation of County and Borough Police where this was thought to be advisable. But these were permissive measures, and counties varied greatly in their response. In almost all of them there was considerable opposition to a Police Force, mainly on the grounds of expense, although libertarian concerns were often paraded. About half the counties managed to set up Police Forces in the years 1839-1841, and a small number of others

followed sporadically in the years that followed. But by 1856 the patience of the government had run out, and an Act making County Police forces mandatory was passed.

Once a County Police Force had been established, it was usually not long before the question of its use for weights and measures control was mooted. If the Inspectors appointed under the 1835 Act could be replaced by police officers, there would be a corresponding saving on the county rate. The logic of this argument was accepted in several counties. For example, in Hertfordshire the Police Force was formed in 1841, and already in 1844 the Police Committee was recommending that its officers be used as Weights and Measures Inspectors. [1] The situation in Hampshire was very similar. [2] In some counties there was a period of transition until the existing civilian inspectors retired, but in others they were simply not reappointed at the next quarter sessions.

Many counties did not set up their own police force until after the mandatory Act of 1856, and these too were quick to use the police as Weights and Measures inspectors. Among the counties in this category was Berkshire, where one inspector for the whole county had been appointed in 1835. His name was John Broad, and his mark was the county badge of a stag under a tree, together with the letters IBI, signifying John Broad Inspector (Figure 1). The Berkshire Police Force was formed in 1857, and by 1866 the superintendents of police were acting as Weights and Measures inspectors for the seven police districts into which the county was divided. The districts were denoted by the letters A to G, and the inspector's mark comprised the county badge with the appropriate letter (Figure 2).

Fig. 1. Berkshire County after 1835

Fig. 2. Berkshire after 1857 District B.

IBI

B

In Somerset the county had been divided into eight districts for W & M purposes in 1835. The Police Force was set up in 1856, and there were initially 14 police districts, to which the borough of Yeovil was added soon afterwards. At the Michaelmas Sessions in 1858 the Court ordered the dismissal of the existing inspectors and their replacement by the superintendents of police. There are several varieties of the Somerset mark (Figures 3,4,5), not all of which have been conclusively dated. However it is certain that the mark comprising a crown over the letters SC and a number (Figure 5) is the one used latterly by the police.

Fig. 3. Somerset

Fig. 4. Somerset

Fig. 5. Somerset

In most cases the county marks used by police incorporated a number or letter indicating the relevant police division (which was often the coextensive with a petty sessional division). But in Lancashire initials were used, such as BH for Blackburn Higher division, LN for Lonsdale North division, and so on (Figures 6 and 7).

But there were a few counties where the police were not used. Middlesex did not have police force of its own, being covered by the Metropolitan Police from its formation in 1830, and so the inspectors there were always civilians. The Metropolitan Police also covered parts of Surrey, although a Surrey Police Force was formed in 1851 and it provided inspectors for the outer

divisions of the county. One or two other counties decided not to use the police for W & M purposes, possibly because the existing inspectors were sufficiently powerful to defend their own interests. In Shropshire the police force was formed in 1840, but civilian inspectors continued to be used until 1886. The police then briefly took over, but gave up the function when the County Council was formed in 1889.

Fig. 6. Lancashire Blackburn, Higher

Fig. 7. Lancashire Lonsdale, North

Fig. 8. Manchester 1843

New municipal boroughs

It will be recalled that 160 English towns had been formally recognised as Municipal Boroughs by the Act of 1835. In the years which followed this number grew steadily, there being two main groups.

Fig. 9. Manchester after 1857, July–Dec.

The first group comprised ancient towns which had been subject to a manorial system of government, but were now able to establish more democratic institutions and thereby qualify for municipal status. But the existence of a municipal borough did not automatically curtail the old manorial rights over weights and measures, and in many places these rights were only purchased after a long period of negotiation.

A typical example of this group is Manchester, which became a municipal borough in 1838. Here, the Lord of the Manor, Oswald Mosley, retained authority over Weights and Measures for a few more years. His mark comprised the royal cipher surmounting the letters OM, followed by the letter M and the year, in the form M43 (Figure 8). Early in 1844 the borough appointed its own weights and measures inspector, Ralph Mellor, although the transfer of manorial functions was not completed until 1846. Manchester was formally designated as a city in 1853 and thereafter used a mark like that shown in Figure 9; the letter A signified the first six months of the year, the letter B the last six months. [3]

An equally complex situation existed in Bradford. Although a municipal borough was established there in 1847, the Manor of Bradford had been in the hands of the Rawson family since the end of the 18th century. The Ladies of the Manor clung to their jurisdiction over W & M matters, and standards were verified in 1860 for their use. It was not until 1866 that the municipal corporation was able to take over the W & M function. The Bradford mark was a boar's head (Figure 10), a reference to a local legend. [4]

Fig. 10. Bradford.

The second group of new boroughs was the result of the growth of industry in the first half of the 19th century, which led to an enormous increase in population in areas which had previously had no form of local government at all. The case of St Helens in Lancashire is typical. [5] Here the first steps towards autonomy were several `St Helens Improvement Acts'. The first (1845) set up a group of Improvement Commissioners and decreed that they should keep standards of weights and measures; the second (1851) instructed them to appoint an inspector; and the third (1855) explicitly defined the area of the local inspector but also preserved the power of the county inspector to operate in that area. The dual authority continued until 1868 when St Helens was incorporated as a municipal borough, and another Improvement Act (1869) specifically revoked the authority of the county. (However it would have been possible for the new borough to

appoint as its inspector the same person} as the county appointed for the surrounding district, and in some similar cases this is apparently what happened.)

Boroughs as weights and measures authorities

In most cases the jurisdiction over Weights and Measures of the newly-created municipal boroughs was legally defined, either by a Local Act, or by transfer of manorial rights. But the position of the original 160 municipal boroughs set up by the Municipal Corporations Act of 1835 was not so clear, since municipal boroughs were not specifically mentioned in the Weights and Measures Act of that year. For this reason in 1859 an amending Act (22 & 23 Vict.c.56) attempted to clarify the situation. This Act specifically authorised the corporation of a municipal borough to become a W & M authority, provided the borough had its own Court of Quarter Sessions.

A further Act of 1861 (24 & 25 Vict.c.75) extended the authority to any borough which had a commission of the peace, even though it had no Court of Quarter Sessions. This was probably done to bring the wording into line with the Act of 1835, which had specifically allowed 129 of the 160 English boroughs to have a commission of the peace. Among them were the 17 counties corporate listed in Part 2 of this article. Almost all of the remaining 112 are known to have functioned as W & M authorities at some time.

The position of the 31 boroughs not given a commission of the peace in 1835 is more complex. A number of these, such as Godalming, had previously exercised some control over weights and measures, but were probably deterred by the expense of appointing an inspector in 1835. A few of them functioned as a W & M authority until the Acts of 1859 and 1861, and some appear to have carried on regardless.

TABLE 5

English Boroughs as W & M Authorities (WMAs) from 1835 to 1888

1. Counties corporate (17): these were specifically constituted as WMAs by the Weights and Measures Act of 1835, and all appear to have functioned as such.
2. Municipal boroughs created in 1835, and having a commission of the peace (112): most of these functioned as WMAs, both before and after the Acts of 1859 and 1861.
3. Municipal boroughs created in 1835, not having a commission of the peace (31): a number of these functioned as WMAs, but many handed their authority over to their county, eventually.
4. New municipal boroughs created after 1835 (60): most of these became WMAs, either by taking over a manorial authority, or by a Local Act.
5. Unreformed boroughs which became municipal boroughs in 1883 or earlier (30): several of these had acquired standards and appointed inspectors around 1835. A few of them (such as Aldeburgh and Lydd) continued to function as a WMA until the 1880s, but most handed over to their county well before that.
6. Unreformed boroughs finally disbarred in 1886 (84): several of these (such has Alnwick, Axbridge, and Bradninch) were active as WMAs around 1835. At least one (Pevensey) claimed to be a WMA in the 1880s.
7. Places wrongly described as boroughs. Places which claimed to be WMAs were sometimes wrongly described as boroughs in official documents. For example, New Buckenham in Norfolk was listed as a borough with a verification mark in the Board of Trade report for 1882, even though it was only a small parish.

Note: Some numbers are approximate!

Table 5 is an attempt to categorise the boroughs and their W & M authority in the mid-19th century. It will be seen that that in addition to the groups whose legal status has already been discussed, there were further categories of boroughs. A number of places claiming to be boroughs had been left `unreformed' by the Act of 1835, and many of them were finally dealt with by an Act of 1883, which allowed 25 of them to become municipal boroughs. The remainder were disbarred with effect from 1886.

Verification marks of the boroughs

Lists of the various kinds of boroughs do exist [6 and 7] but there is no definitive list of those which functioned as W & M authorities. There is a return of those which were functioning in 1867 in the Fourth Report of the Standards Commission [8] but of course it omits all those boroughs which either stopped functioning before 1867 or started functioning after that.

One of the aims of the Local Verification Marks Project is to produce a consolidated list, with as much detail as possible about the marks used and the relevant dates. This requires further research into the history and development of a considerable number of boroughs, together with analysis of the evidence provided by the marks themselves.

For many years, the *Monthly Review* of the Association of Weights and Measures Inspectors carried occasional notes on the marks of various localities, many of them written by H.W. Speight. These were continued in *Libra*, under the editorship of Maurice Stevenson, who also provided a list for the second edition of the Shire Album on *Weights and Measures* [9] The early issues of *Equilibrium* contained an extensive list of the marks then known, compiled by Michael Crawforth [10] Since that time there has been some progress in identifying marks, but little attempt to consolidate the information. The LVM Project aims to do this by putting the marks into their legal and administrative context.

The marks shown here (Figures 11-27) are a selection from the enormous variety of marks used by boroughs in the middle of the 19th century. Several of these marks have not previously been identified.

Fig. 11 Kendal 

Fig. 12. Carlisle 

Fig. 13. Reading 

Fig. 14. Gateshead 

The standards commission of 1867-70

In 1866 a Royal Commission was appointed to look into the condition of the exchequer standards of weights and measures, and other relevant matters. The four Reports of the commission comprise a wide-ranging enquiry into all aspects of W & M administration, and, in particular, the Fourth Report [8] covers the verification of weights and measures by local authorities.

Fig. 15. Pontefract 

Fig. 16. Sunderland 

Fig. 17. Kidderminster 

Fig. 18. Bewdley 

The commission found a bewildering system of local inspection, with the level of competence differing widely from place to place. Some inspectors were full-time officials whose technical knowledge was impressive. Others were poorly-educated country policemen who had received little training in technical matters. The commission's enquiries also revealed that despite the legal emphasis on the counties and the boroughs as W & M authorities, a number of anomalous jurisdictions still persisted.

Fig. 19. Launceston 

Fig. 20. Daventry 

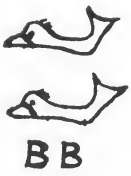
Fig. 21. Brighton 

Fig. 22. South Shields 

Anomalous jurisdictions in the 1860s

Perhaps the most significant anomaly was the City of London, where the ancient rights of the Founders Company to stamp weights had been specifically preserved by the Act of 1835 (Section 43). At that time the Founders' Company had written to provincial counties and boroughs claiming that the London marks alone were sufficient and that local inspectors need add no further mark of validity. But in fact provincial inspectors did often add their own mark to weights, including those bearing the full set of London marks from the reigns of George IV and William IV.

Fig. 23. Salford 

Fig. 24. Barrow in Furnace 

Fig. 25. Ashton under Lyne 

Fig. 26. Higham Ferrars 

By 1840, London weight-makers had realised [11] that it was now inappropriate for the Guildhall marks (the dagger and the royal cypher) to be put on weights which were to be used outside London. This explains why many weights from the Victorian era have only the Founders' marks (the ewer and the A), together with a local verification mark. It appears that by 1870 it had become the practice for the London makers themselves to stamp the marks, which had become less ornate (Figure 28).

Fig. 27. New Buckenham 

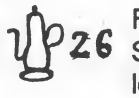
Fig. 28. Mid-Victorian Founders' Co. 

Fig. 29. St. Marylebone 

Fig. 30 Manor of Wakefield 

In any event, stamping at the Guildhall and the Founders' Hall slowly declined, particularly as brass weights made in the provinces replaced the older bronze ones. Weights for use within the city itself still required the full set of marks, and from 1835 onwards there were two inspectors for the city who operated in much the same way as those in the rest of the country.

Another anomaly was the City of Westminster, which still retained its W & M authority. In 1861 the Annoyance Jury had been outlawed (24 & 25 Vict.c.78), and the Court of Burgesses had appointed a paid inspector, Thomas Cook. He had previously been `sealer' for seventeen years, and he continued to mark weights with the portcullis bearing the date 1826.

The large London parishes of St Marylebone, St Pancras, Paddington, and Islington also attracted the attention of the Commission. They interviewed Edward Morrison, a Middlesex inspector whose geographical district contained the four parishes, and the Vestry clerk for St Pancras. The situation in Paddington and Islington was confused (and remains so), but it was clear that St Marylebone and St Pancras were still operating as W & M authorities under the respective Local Acts. Indeed there is a St Marylebone mark with the date 1867 incorporated (Figure 29).

However, some progress had been made. In the ancient university towns of Oxford and Cambridge, the municipal authorities took over Weights and Measures from the Chancellor of the university in 1868 and 1856 respectively. Boroughs and counties had taken over most of the old manorial authorities, although there was one remaining large manorial jurisdiction, the Manor of Wakefield. This covered a large area of the West Riding of Yorkshire, including parts of the rapidly-growing boroughs of Huddersfield, Wakefield, Halifax and Dewsbury, and its mark, the crowned MW, is fairly common (Figure 30).

The Weights and Measures Act of 1878

The deliberations of the Standards Commission eventually bore fruit in the great Weights and Measures Act of 1878 (41 & 42 Vict.c.49), which superseded all previous legislation on the subject. The intention of the Commission was that the privilege of being a Weights and Measures authority should be confined to counties, large boroughs, and the City of London. Presumably there were `political reasons' why this could not be completely achieved at that time, because the 1878 Act allowed a number of exceptions. Section 50 of the Act specified that, in order to qualify, a borough had to have its own Court of Quarter Sessions, but it went on say that other boroughs could decide for themselves if they wished to become a W & M authority and, in any event, if they were already functioning they could continue to do so. Almost as an afterthought, the Fourth Schedule to the Act states that the word `borough' is to mean `borough with a commission of the peace', so in effect there was no change in the situation regarding boroughs which had existed since 1861. The Fourth Schedule also allowed the Soke of Peterborough to be considered as a county, but asserted that any other liberty of a county was considered to be part of its county. (This should have affected Bury St Edmunds, Ely, and Ripon but, in practice, it is not clear that it did.) Finally, Section 69 contained the traditional formula safeguarding the ancient rights of Leet Juries and the City of Westminster.

A slightly more effective provision was that inspectors should stamp weights and measures with a verification mark *`under this Act'*. In practice this allowed the Board of Trade to introduce a uniform system of verification marks, with the aim of replacing the plethora of heraldic devices, symbols, letters, and names currently in use. The uniform mark consisted of a crown above the letters VR (Victoria Regina) followed by a number identifying the locality. However the Act did not make the uniform system compulsory, and it took a number of years before it was universally accepted. So the permissiveness of the Act meant that it did not immediately signal the end of the practice of putting quaint and interesting marks on weights.

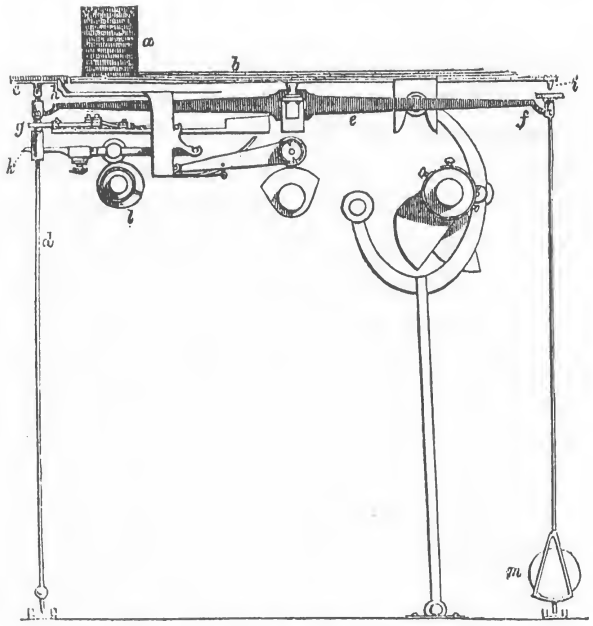
The Act also avoided other problems which had been addressed by the Standards Commission. It did not make it obligatory for inspectors to be qualified, and (in counties) it allowed their appointment to remain with the unelected justices. The next article in this series will cover the years following the Act, when slow but certain progress was made on most of these outstanding problems.

TO BE CONTINUED

References

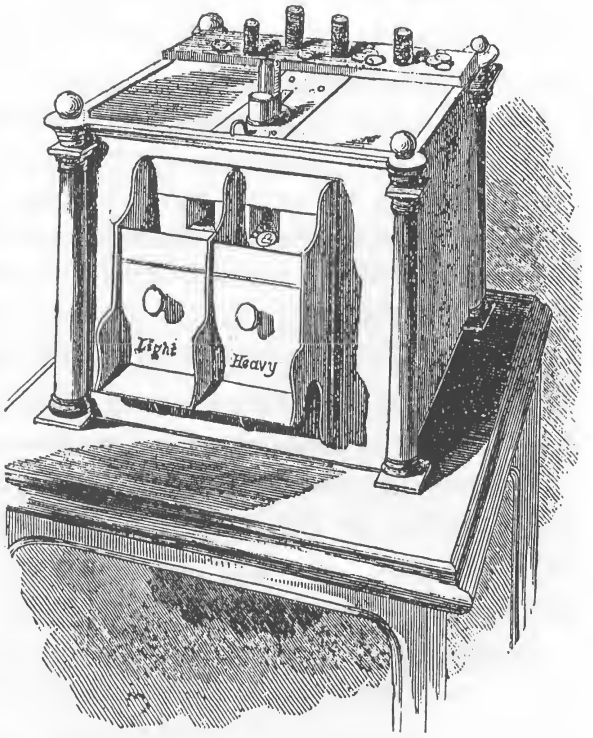
1. *Hertfordshire County Records*, volume II. p 420–423.
2. R. Foster, *The Politics of County Power*, Harvester Wheatsheaf, 1985, p 99.
3. *Fourth Report of the Standards Commission, Parliamentary Papers* 1870 XXVII, p 86–101.
4. H.W. Speight, *Monthly Review*, March 1931.
5. Information kindly supplied by Mike Sharpe.
6. J.R. Somers Vine, *The Municipal Institutions: Their Growth and Development*, Waterlow, London 1879.
7. W.B. Faraday, *The English and Welsh Boroughs*, London (n.d.).
8. *Fourth Report of the Standards Commission, Parliamentary Papers*, 1870, XXVII.
9. J.T. Graham, *Weights and Measures*, second edition, Shire, 1987.
10. M.A. Crawforth, British Verification Marks, *Equilibrium*, 1978–79, pp.20–24, 43–48, 67–72, 90–96, 115–124, 163–165.
11. G.B. Airy, *Papers Relating to the Restoration of the Standards of Weight and Measure*, Clowes, London, 1841, p 1318.

William Cotton's Sorting Machine



At this time the Bank had nearly 8,000,000 of sovereigns in the coffers; and that no light ones might be issued to the public, the Governors caused their whole stock to be re-weighed singly—an immense amount of labour; and a large quantity of light, and sovereigns of a doubtful character, separated from the stock, were sold as bullion; and the loss, which was very considerable, was sustained by the Bank. It was then that the present Governor of the Bank, Mr. Cotton, a gentleman of great scientific attainments, devoted much time and attention to this subject—first, to discover the causes of the error; and secondly, to provide a remedy. The causes he found to be currents of air acting unequally upon the scale-pans; a constant diminution of the weight of one of the pans by the act of placing and displacing the sovereigns to be weighed, by which the equipoise was every moment destroyed; adhesion of the scale-pans to the counter; difference in the rate of vibration of the beams of the scales; difference in the judgment of the weighers; failing of the eyesight; flagging of the attention, from the monotony of the employment; defects of principle inherent in the construction of the common scales, such as could be used for the purpose; difference in the weights, notwithstanding the Mint stamp, of no small amount, considering the degree of accuracy required.

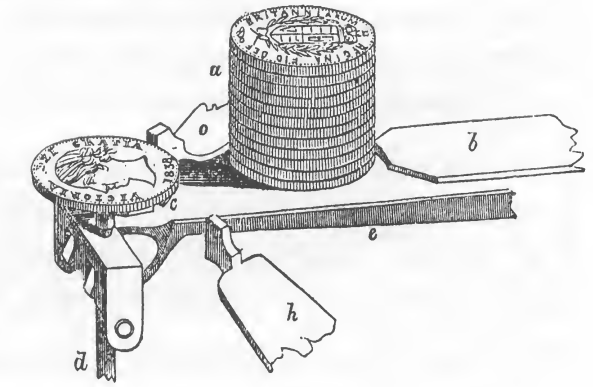
These, and many other sources of error, not easy to describe here, which seemed at first irremediable, are all effectually overcome by a machine which was the result of Mr. Cotton's labour and ingenuity. When we remember the loud outcry made against the Bank on this account, we think it but fair to state some of the difficulties under which it laboured, and but just to Mr. Cotton, for without it many of our readers would not be able to appreciate the value of his invention.



The machine appears to be a square brass box, in the inside of which, secure from currents of air, is the machinery. On the top of the box is a small cylindrical hopper, which will hold about forty sovereigns, and in front of the box are two small apertures, to which are fitted two receivers, one for the soverigns of full weight, and the other for the light. Besides the driving wheel this is all that appears on the outside.

In the inside, very near to the upper plate, is the beam, or balance, of very delicate and beautiful construction. At one end of the beam, and above it, upon a very fine edge, is poised a small platform (*c*), which receives the sovereign to be weighed. This platform, which is, in fact, one of the scales, is kept in its position by means of a small pendulum (*d*). In this pendulum, about an inch below the platform, is an oblong perforation, about half an inch long, technically called a slot, in which works freely, up and down, without touching the sides, a small ivory rod (*k*).

Between the slot and the platform is placed a pair of forceps (*g*). On the other end of the beam, suspended upon a fine edge, similar to that upon which the platform rides, is a very small round polished plate, and at the bottom of this pendulum, which keeps it poised in its place, is the scale (*m*) to hold the weights. Above the small round plate, under the top of the box, is fixed an agate (*i*), with a blunt point. When the machine is set in motion, the small ivory rod is depressed; this touching the bottom of the slot, or opening in the pendulum, in which it works, brings down the beam on that side, and raises it of course on the other, the weight side, until the small round plate on that side touches the blunt agate point. The beam is then in a horizontal position. As soon as this is effected, the forceps catch hold of the pendulum between the platform and the slot, and hold it firmly. The balance is then in a condition to receive the sovereign, which is shifted from the bottom of the pile (*a*) in the hopper, and brought by means of a slide (*b*) along a channel, just large enough for a sovereign of the proper standard gold to pass, but not large enough to admit a counterfeit, and deposited upon the platform. The forceps then let go their hold, and the ivory rod is gently raised, and if the sovereign happen to be light, that end of the beam rises, and the other end leaves the agate point; but if the sovereign be full weight, the beam remains stationary, and the small plate on the weight end in contact with the agate point. Supposing the sovereign to be weighed, then comes the operation of removing it. This is effected by a very curious contrivance. There are two bolts (*h o*) placed at right angles to each other, and on each side of the platform or scale there is a part cut away so as to admit of the bolts striking so far into the area of the platform as to remove anything that would nearly fill it. These bolts are made to strike at different elevations, the lower striking a little before the upper one. If the sovereign be full weight, the scale remains down, and then the lower bolt (*o*), which strikes a little before the upper, knocks it off into the full weight box. If the sovereign be light it rises up, and the first bolt strikes under it, and misses it, and the higher bolt (*h*) then strikes and knocks it off in the light box.



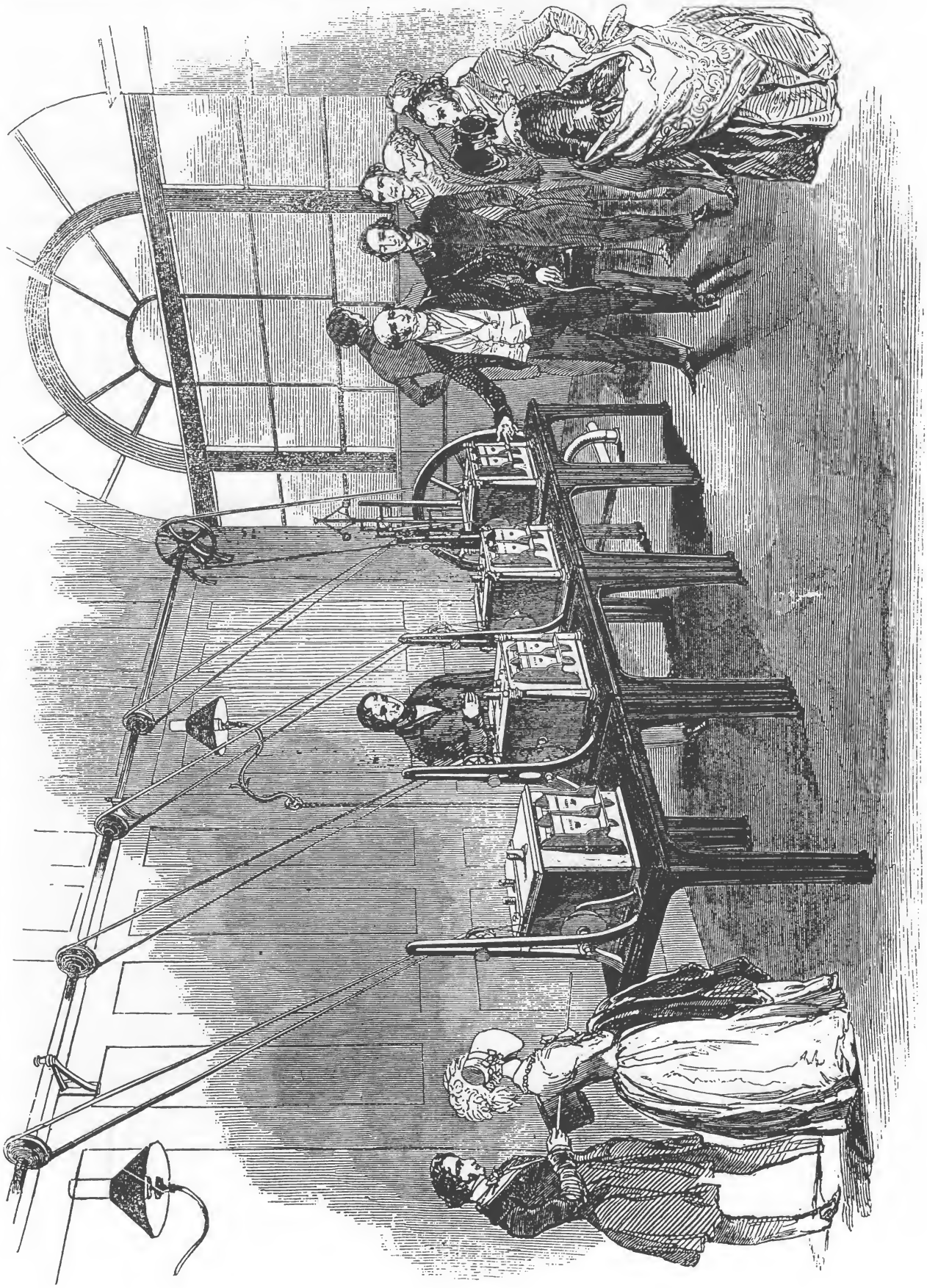
This operation, which takes a long time to describe, is performed in about two seconds, as the machine weighs at the rate of 33 per minute.

The weights used in the machine are made of glass, and are nicely adjusted by the trial balance before mentioned.

The advantages thus obtained are the greatest accuracy, great dispatch, with very little expense of manual labour.

From the Illustrated London News, March 22, 1845

THE WEIGHING OFFICE, AT THE BANK OF ENGLAND.



SOVEREIGN WEIGHING MACHINE, BANK OF ENGLAND.

More Flexure Springs Part 3

By D Crawforth-Hitchins

J Harper & Co. Ltd. and C Crowley jointly patented their domestic weighing-machine on 7th Nov., 1950. British patent no. 695,976 drawing, shown in Fig. 28, stated that *"In [the fig] the scale pan 22 of a domestic weighing machine is supported by a stem 20 located by knife-edge 25x at one end of a cantilever spring 13. Stem 20, which is maintained upright by pivoted link 17 and by a keeper 27 attached to spring 13, moves in a vertical direction upon application of load to operate, through a link 42 and a slotted cam 47, a pointer 28 over a scale 36 which is visible through a window 41. Pointer 28 is pivoted at 30 on a bracket 31 and provided with a counterweight 29. Cam 47 is so shaped that the scale is linear. The positions of link 42, bracket 31 and scale 36 are adjustable by screws 43, 32 and 40 respectively. In a modification for heavier loads an additional pivoted link 48 is provided, knife-edge 25x and keeper 27 being dispensed with."*

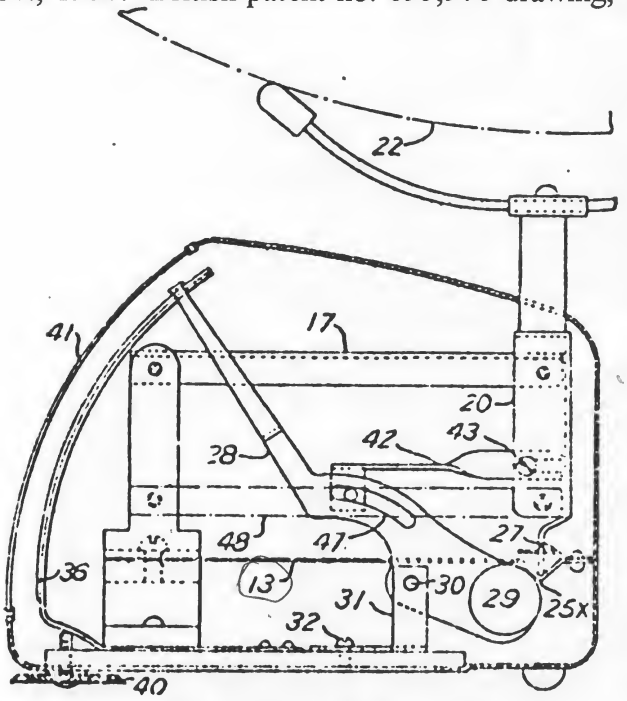


Fig. 28. J Harper & C0. Ltd patent of 1951.

All these numbers seem confusing. Michael Crawforth's catalogue entry reads *"Parallel links and flat spring flexure resistant! Adjustable strip varies length of spring in use for scale expansion adjustment. Counterpoised pointer operated by a pin and cam slot, with adjustable arm to set zero. Curved rectangular card of white plastic graduated 0 - 2 kg x 100g. on one side and 0 - 4 lb x 1 oz. on the other. The card can also be adjusted for zero by a screw through the base, Wire spider with rubber ferules to support goods pan. Mechanism*

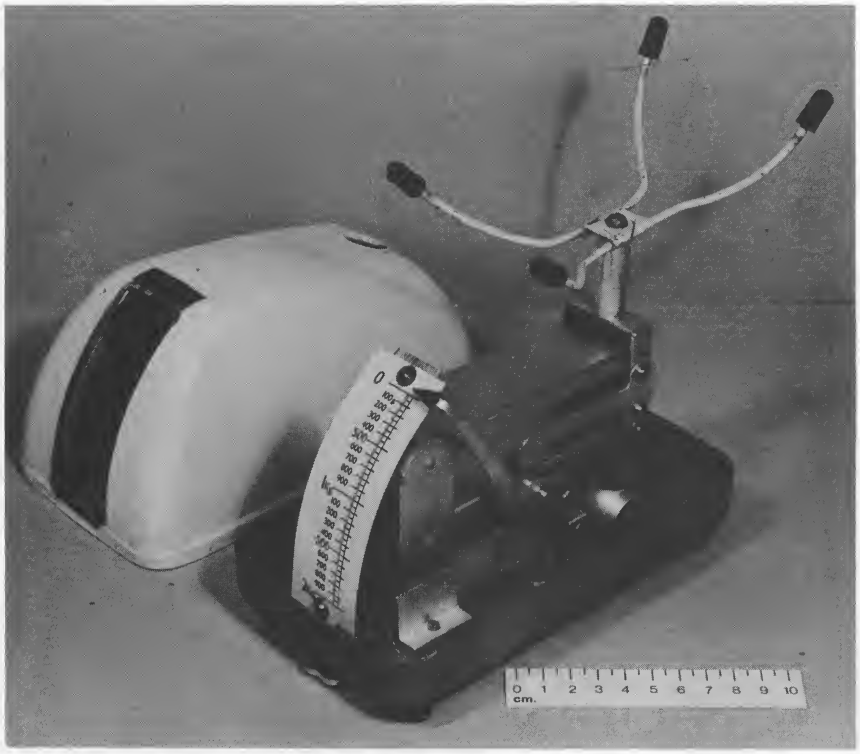


Fig. 29. Michael's enthusiasm was aroused by the interior.

mild steel painted silver, mounted on pressed steel base painted lightish blue. Pressed steel top cover painted white with rectangular plastic covered window for the scalecard and "J HARPER & CO. LTD. Made in England." Bought in North Shields for 35p. in 1971. An interesting mechanism provided with every means of adjustment, but spoilt by a badly styled case. Compare with French-made balance by Terraillon which uses the same system of flat springs. Removed from collection (crossed out) Re-introduced Nov. 1975." The final comment arose after Michael threw it out as too nasty to have in the collection, then put it back after he had dismantled it and discovered how interesting the mechanism was! So, don't be hasty with monstrosities!

Fig. 30. An advertisement from *Woman's Own* magazine 1955.

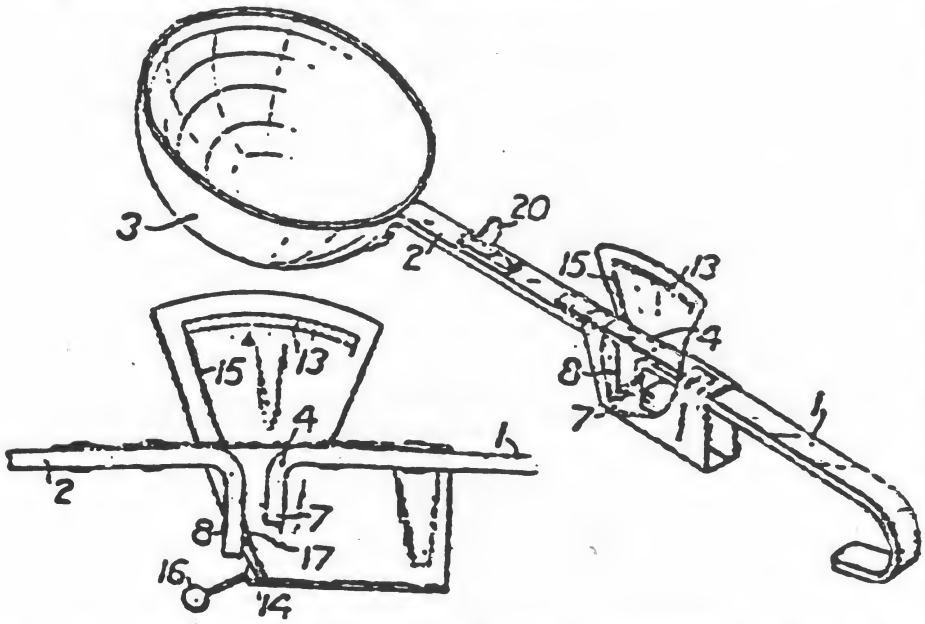


Fig. 31. British Patent 735,559 drawing. The drawing matches the Scadle, not the Duplex. Did Duplex change their ideas between being granted the patent, and making it?

Ladles for kitchen use were an obvious use for a flexure spring. See the Front Cover. Replace part of the handle with a spring, and the load naturally bent down slightly. Add a graduated arc and a pointer and a primitive weighing mechanism was possible. British Patent 735,559, of 12th May, 1953, granted to British Duplex Seals Ltd. was a classic kitchen scoop. The patent stated *"The shank of a ladle is divided in two parts by a leaf spring 4 so that when the part 1 is held horizontally, the part 2 inclines under the weight of the ladle contents. Downward extensions 7, 8 of the parts 1, 2 prevent over-flexing of the spring 4. A pointer 15 pivoted at 14 and weighted at 16 has an extension 17 bearing on portion 8 so that as the part 2 inclines the pointer is moved over a scale 13 rigid with the part 1. Zero adjustment is provided by a movable screw 20."* Why was British Duplex Seals Ltd. patenting The Scadle that was manufactured by Praktik, and using the patent number granted to them on their plastic Duplex?

On examining a Scadle, there were some differences from the plastic version shown in Fig. 32, which *was* manufactured by British Duplex Seals Ltd, the most obvious being that it was made out of zinc alloy, as shown in the patent drawing sent in by British Duplex Seals Ltd. (Fig. 31). The casing left the pendulous weight (that kept the pointer in contact with the beam) exposed. It also left the pointer and the printed graduations exposed. The adjustment screw was not hidden under the handle, but protruded vertically, and (according to the patent) worked by forcing apart the spring and the handle. The casing was merely wrapped round the spring, leaving the ends open, so that dirt and sticky food could get inside the apparatus very easily. The scoop was made separately of aluminium, and riveted on to the end of the beam. The spring was riveted to the top of the beam, leaving the rivets exposed. Previously we had awarded an American egg scale the medal for lack of hygiene, but the Scadle has to be the winner! The perpetrators of this salmonella cradle were "Praktik Products, with U.S.T.M. Reg.- Pat Pend." Michael annotated our catalogue with "Made in Austria for the USA".

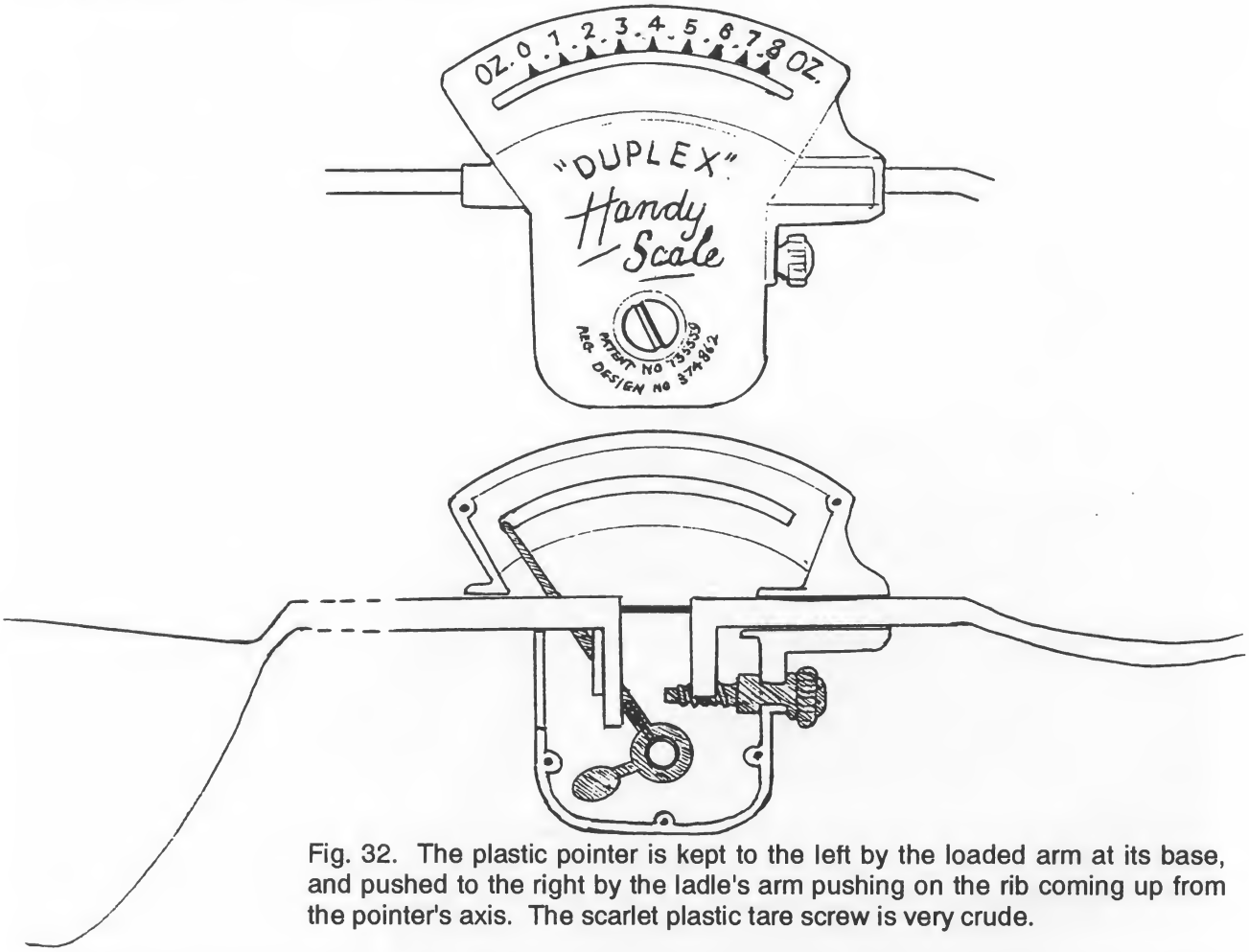


Fig. 32. The plastic pointer is kept to the left by the loaded arm at its base, and pushed to the right by the ladle's arm pushing on the rib coming up from the pointer's axis. The scarlet plastic tare screw is very crude.

The version in the drawing in Fig. 32 was made of white plastic with red plastic details and is shown at the top of the cover picture. It was as typical of its period as the Presto in Fig. 27, page 1935. On attempting to use the scoop, the handle bent ominously under any load of more than 4 oz, but, as the scoop had a limited capacity, it was difficult to find a kitchen ingredient dense enough to fit into the scoop and weigh more than 4 oz!

To be continued.

Review

Directory of British Scientific Instrument Makers 1550–1851, by Gloria Clifton, published by Zwemmer in association with the National Maritime Museum, with the assistance of the Scientific Instrument Society whose generous support has made the publication of the directory possible. ISBN 0 302 00634 6. Available from Trevor Waterman, 75a, Jermyn Street, London, at a current price of £65.00 plus packing and postage.

This is not a disinterested review. It is highly partisan, because this is Project SIMON in its published form. Project SIMON was originally envisaged by Gerard Turner as an investigation into the technical methods used by instrument–makers and the initiation, evolution and dissemination of those techniques. Gerard Turner and Trevor Waterman enthused a benefactor (who wished modestly to remain anonymous, but he is a far–sighted, civilised and kind man who has a passionate belief in the need for background research to back up the history of science,) and Turner invited Michael to carry out the research, having read Michael's book *Weighing Coins*. Michael wanted to investigate the techniques, but was dismayed by the lack of knowledge of when each instrument was made. How could he say that one maker was the first to use a technique when no list of makers' dates at any particular address was available? Michael suggested to Turner that he first compile a dating list then look at the techniques. This was considered reasonable by both Turner and the benefactor. Michael set up the parameters of Project SIMON (**S**cientific **I**nstrument–**M**akers, **O**bservations and **N**otes) after prolonged discussions with me, and we set to work, Michael working 8 am–6 pm, and me about half that (Michael being paid, and me joining in for the fun of it.)

Michael and I worked on Project Simon from 1983 until he died in 1988 and the list (something of the order of 12000 workers in the industry, and 7000 makers at that point) was handed to Dr. Gloria Clifton, with all the notes, the computer and the reference books.

Gloria Clifton has done an excellent job of completing the search for makers (adding about 25% of .new. names and adding much valuable .new. information to our list) and editing out all the confusing men of the same name, and names that are probably mis–readings by earlier authors of names on instruments. She had the misfortune to have a publisher who went bankrupt, and to have a second publisher who had no recognition of the need by academics for this book and demanded financial backing. It took her 7 years to get it out, but at last it is available. Only 1000 Directories were printed, and a goodly proportion of those have been sold, so I recommend that those desirous of buying it get in contact with Trevor Waterman as soon as possible.

The *Directory* lists over 5000 scientific instrument–makers and retailers working in the British Isles, together with a further 10000 names of apprentices and associates. It includes chemical, mathematical, nautical, optical and philosophical makers, as well as specialists such as balance, barometer, compass, rule and telescope makers. There are also 100 illustrations of makers' advertisements and engraved signatures. Each entry includes estimated working dates, specific trades, addresses, training, apprentices, partners, types of instruments made and brief biographical details, where known. There are also indexes of names and towns. The volume is based on a computer database maintained at the National Maritime Museum, Greenwich, much of it compiled from new research in original sources.

Being an alphabetical list, it is easy to extract information on the maker of a named instrument. To economise on space, the sources of the information are listed at the end of each entry without stating which item came from which source. Some sources can be deduced, (if he was a member of Blacksmiths' Co., any bindings will come from Blacksmiths' Co. records. If an instrument is mentioned, it probably resides in a museum or private collection mentioned. If an address is given, it probably came from a Street Directory for that town.) The information is very clearly laid out, except where a master to whom an apprentice was turned–over appears to be one of those apprentices. There is a paucity of instruments mentioned, making it difficult to envisage what the master was doing all his life. This short–coming can be remedied to some extent by using this book in conjunction with other books on instruments. It is extremely difficult to proof–read lists full of abbreviations, but this Directory is incredibly accurate and the abbreviations are easy to interpret.

In spite of Clifton's claim to have included over 5000 makers, she has omitted over a third of the scale–makers who qualify by her criteria. Has she omitted a third of the instrument–makers who qualify? Many of those she omitted were provincial makers about whom it is difficult to obtain information, so one must regret their omission. She has included some very peculiar people, architects, iron–founders, mirror–makers, and dozens of spectacle–makers who are not known to have made instruments. A few patentees (who did not make their invention) have been included. Some makers who worked exclusively for an Institution making unique, hand–made instruments and who did not sell their products, are included. Some authors and inventors are included who went to instrument–makers to get their ideas realised.

I am dubious about the inclusion of men whose only claim to fame is that they were the master of a known maker (e.g. Peter Cooke). Michael and I intended to include only those men who had two links to known makers, to minimise the risk of wrong attributions.

Clifton has 5 pages of Introduction, well–written, informative and essential reading before using the Directory. She points out many uses for the information, many lines of research that should be followed up in the future and discusses some of the implications of all this material. Much of the work should be done on the computer, although such information can be sifted out by the reader, laboriously.

Unfortunately credit has not always been given to people who gave generously of their time and knowledge, but Clifton never asked who to thank for information put in during the first 4½ years. Martin Suggett was most generous in giving access to the Liverpool list, Charles Mollan and John Burnett helped us with information on the Irish makers, one collector gave us his index of some 900 entries of his collection with all his research, and Andrew Crawforth compiled all the Directory entries on North–East English makers from Trade Directories held by libraries up there, going in his own time to search the numerous Directories.

For members of ISASC the Directory can provide information on about 800 scale–makers, but the instruments are described only as .balance. or .weights., rather than as .diamond scale., .steelyard. or .coin weight.. So is it worth spending 8 pence per scale–maker? That seems a bargain to me, and worth every penny. Clifton did not share the authorship with Michael, but this book is still a memorial to him and any ISASC members with British scales will find this book useful and interesting. D F C–H

Response

from G BATZ

to the question on page 1936:- "To which Act did these weights relate?"

In parenthesis, going back to EQM page 926, there is a typo on line 5 of page 927 where 46.27447 should read 46.4725, the former being a misreading of the result of the equation = 123.27447, the mass of one sovereign, according to law. Minus exactly 4 grains gives you 119.27447, the inscription on the coin weight.

There were supposed to be 46.725 pounds sterling in one pound troy, according to the laws of England for the making of the sovereign as of 1816. Dividing 5760 grains by 46.725 pounds sterling: result 123.27447 grains.

The half sovereign weight shows the inscription 61.63724. This is derived this way:

Take half of 123.27447 being	61.63723
Deduct four grains, thus	4.00000
Result is tolerance mass as shown on the smaller coin-weight	57.63723

Now, for the law itself. I am greatly indebted to a very fine gentleman whom I met at another American Numismatic Association Anniversary Convention, and he is G. P. Dyer, Librarian and Curator of the Royal Mint at Llantrisant, Wales. He sent me copies of English, better say British, laws of the year 1889 and two orders-in-council, and a proclamation, from 1889 and 1890.

Although the coin weights speak of the "Light Gold Coins Act", the Law itself was entitled "An Act to Amend the Coinage Act, 1870, as respects Light Gold Coins", and its short title was COINAGE ACT, 1889 (52 and 53 Victoria, Chapter 58). (The style of the act is followed by the 52nd and 53rd year of her reign, and the Act became Chapter 58 of the Laws.)

The Coinage Act, 1870, provided that "*where any coin is called in by any proclamation*", or where any coin is below the current weight as provided by law, a person was required *"by himself or by others (to) cut, break or deface any such coin tendered to him in payment and the person tendering the same shall bear the loss.*"

Since this was probably a very severe blow to anyone, having received a coin that was below par innocently or otherwise, the law was changed in 1889 to shift the loss to the government provided a full or a half sovereign had not been diminished by more than 4 grains. In a schedule to the Law it was made clear that a coin had been illegally dealt with if the loss of mass was greater than "*four grains from the standard weight.*" The standard weight, the schedule continues, of a sovereign is 123.27447 grains, and the standard weight of a half sovereign is 61.63723 grains.

This then is the origin of the generous 4 grain allowance off both sizes of coin. And the reason for the inscriptions on my coin weights.

Response

from A RANGELEY

I was interested to see the illustration of Jaap Visser's Light Gold Coin weights on page 1936 of EQM, as I have a brass box-end beam-scale of 2 oz capacity with brass pans and chains, mounted

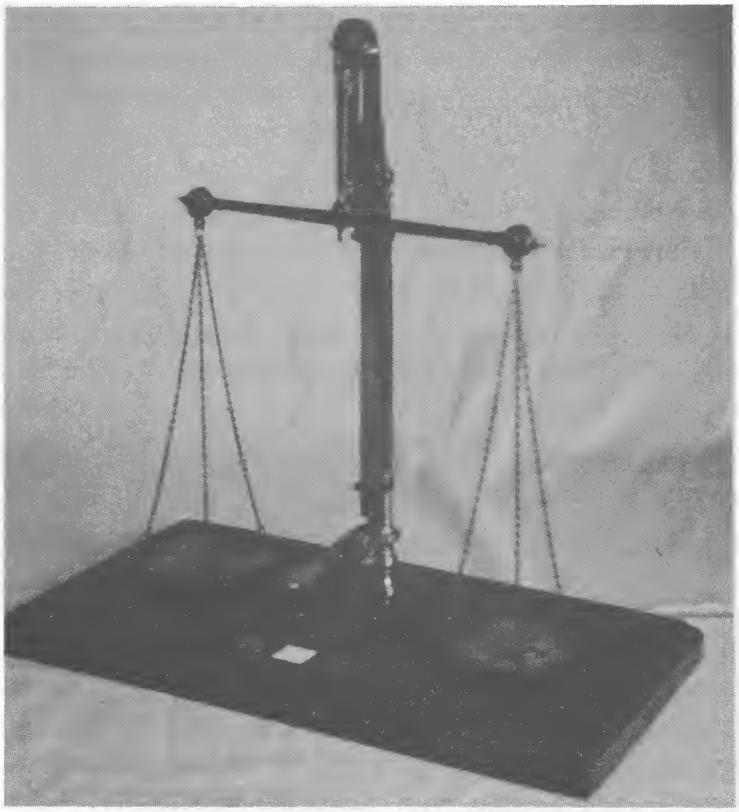


Fig. 1. Rare coin scale on a pillar, with a slide-lift, c. ~~1870.~~ 1869 Photo J Lound

on a mahogany base which incorporates these weights in two recesses, one on either side of the relieving handle. See Fig. 1 and 2.

The 1816 Act of George III, 56 Chapter 68, enacted that gold coin of the United Kingdom and Ireland should be 22 carat, i.e. twenty-two twenty-fourths gold and two twenty-fourths alloy, and that there should be one thousand, eight hundred and sixty nine sovereigns minted from forty Troy pounds of standard gold, i.e. 22 carat.

40 Troy pounds at 5760 grains to the pound equals 230,400 grains. Divide 230,400 by 1869 and this equals 123.27447 grains, or 5 dwt 3.7447 grains per sovereign. The half sovereign weighs half of the above.

The weight we must consider is the true weight of a sovereign and not the weight indicated on coin weights, viz. 122.5 grains or 5 dwt 2½ grains.

The Coinage Act of 1870, Chapter 10, confirms these figures and also states that the **least current weight** is 123.5 grains, hence the markings on the coin weights.

An amendment to the Coinage Act 1870 was subsequently enacted on 30th August 1889, Chapter 58, entitled "*An Act to Amend the Coinage Act, 1870, in respect of Light Coins*".

The gist of the enactment is that sovereigns minted during the reigns of George III, George IV and William IV which were below the least current weight of 122.5 grains and which had sustained their deficiency through fair wear and tear and not through *"having been illegally dealt with*", i.e. clipping, would be replaced "*without charge or loss*" to the owner. Any expenses incurred by this exchange would be defrayed out of moneys provided by Parliament.

Any deficiency of **four grains and above** would be deemed to have been prima facie evidence that the coin "*had been diminished by other means than fair wear and tear*" and repayment would be made according to weight, the loss being borne by the owner.

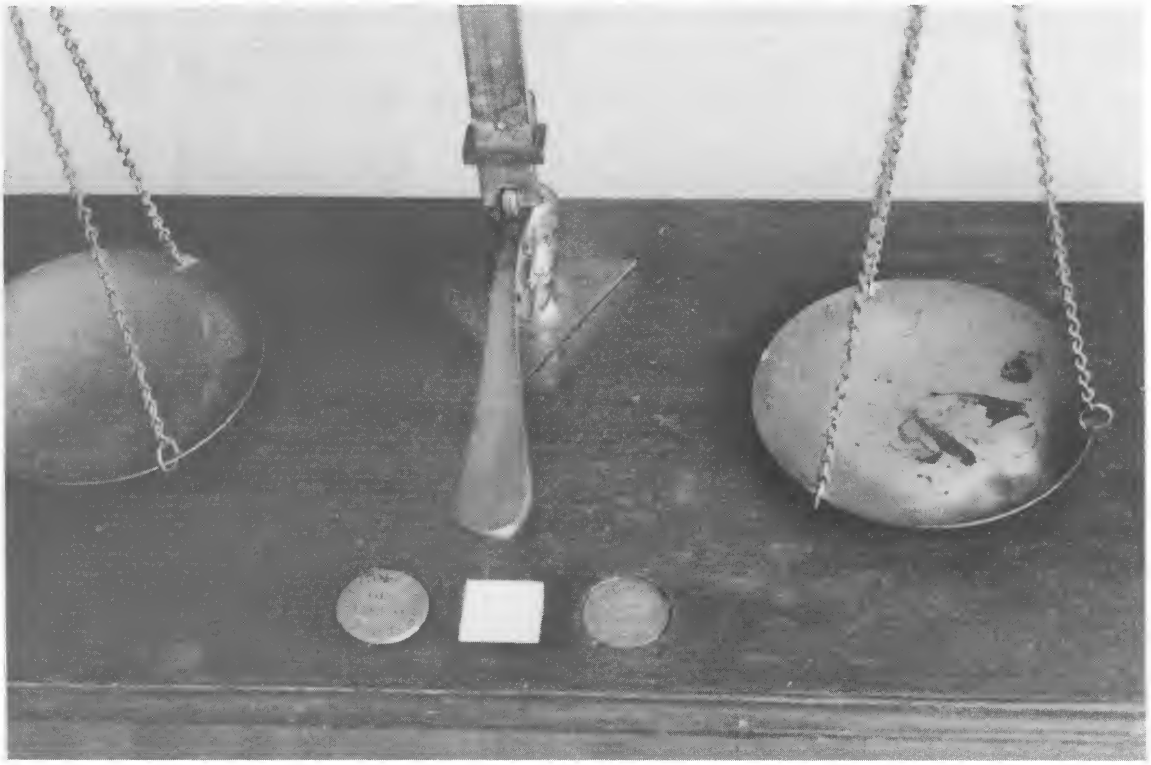
Thus we can see quite readily the reason for the production of the "Light Gold Coin" weights featured in EQM page 1936 and the scale now featured in this issue.

The enacted weight of the sovereign is 123.27447 grains. Subtract the four grains allowance for fair wear and tear and we are left with 119.27447 grains, the amount of the "Light Gold Coin" weight.

Similarly the enacted weight of the half sovereign is 61.63723 grains. Subtract the four grains allowance and we are left with 57.63723 grains, the amount of the other "Light Gold Coin" weight.

The scales and weights were therefore used by Banks to determine which coins would be replaced without charge or loss to the owner. Any sovereign or half sovereign which did not turn

Fig. 2. Close-up showing the weights in their sockets. To extract the weight, press the near edge of the weight, to make it tip into the cut-away at the front of the socket.



the scale against the appropriate weight would be deemed not to have been subject to fair wear and tear, but to have been illegally dealt with.

As a matter of interest, a second amendment to the 1870 Act was introduced on 5th August 1891, Chapter 72, which covered Victorian sovereigns, when the deficiency was reduced to three grains. The sum of £400,000, being the estimated cost of exchange, was set aside from the Consolidated Fund for the "*improvement of the coinage*".

In view of the short period which elapsed between the two amendments to the 1870 Coinage Act, the weights must be of some rarity, having been made for one purpose only.

Response

from A RANGELEY

to the article on page 1929:

Norman Bigg's feature on verification marks casts doubt on the functioning of the Liberty of Cawood, Wistow and Otley. I enclose a photocopy from an 1822 publication which categorically states that this Liberty had separate jurisdiction. See Fig. 1.

In addition, 1822 Baines for Yorkshire has an entry as follows:-

James Dawson,
Chief Bailiff to the Archbishop for the Liberty of Cawood, Wistow and Otley, Crier of the Court, and Inspector of the Weights, etc.
Westgate,
Otley.

LIBERTIES IN THE WEST-RIDING

BOLLAND	KNARESBOROUGH	PONTEFRACT	MANOR OF WAKEFIELD
CLIFFORD'S FEE	LEEDS	RIPON	DONCASTER
STAINCLIFFE	TICKHILL		HONOUR OF PONTEFRACT
HALLAMSHIRE	CAWOOD, WESTOW & OTLEY		

Each of these liberties has a separate jurisdiction and local courts in which pleas are holden. The principal of those courts are, the court baron of the honour of Pontefract, of which John Hardy, Esq. is steward, and the court baron of the manor of Wakefield, of which the Duke of Leeds is steward. Formerly these courts could not hold pleas in cases exceeding forty shillings; but in the 17th of George III an act was passed "for the more easy and speedy recovery of small debts, within the parishes of Halifax, Bradford, Keighley, Bingley, Guiseley, Batley, Birstall, Mirfield, Hartshead-cum-Clifton, Aldmondbury, Kirkheaton, Kirkburton, Huddersfield, and the liberty of Tong," establishing courts of requests for those places in matters not exceeding forty shillings; and "for extending the jurisdiction of the courts baron of the honour of Pontefract, the manor of Wakefield, and the manor of Bingley," from forty shillings to five pounds. The various liberties of the West-Riding do not by any means comprehend all the places within this division of the County of York, but they contain a large portion of them, and in this publication the liberty in which each town, village and hamlet, (if within any of them) is pointed out.

Fig. 1. Published in 1822.

Immediately behind Westgate is the site of the Archbishop's Palace and this is indicated on the Ordnance Plans of today. The adjacent Manor House which was connected with the Palace exists today and is now used for commercial purposes.

I have supplied Norman with three weights for the Liberty bearing excellent verification marks of CWO below the mitre.

Incidentally, of the Liberties mentioned, Doncaster had DON with a rose, Wakefield had MW, Leeds had the fleece and Ripon the Wakeman's horn, and who knows if the rest of the Liberties had their own mark. A weight bearing the "Honour of Pontefract" would be very grand.

Notes and Queries

N & Q 128 — reply from Keith Binns of the Antique Metalware Society

Correctly the term "paktong" is reserved for the white copper-alloy that was imported into Britain from China as scrap, and re-worked by British craftsmen into high-value items. Most paktong came to Britain, as you stated, around 1760-1790.

However, I must disagree with Michael Crawforth's statement that the white copper-alloy with nickel in it (commonly called German silver) was not used in commercial quantities until about 1880. It would be more accurate to say, "About 1830." mja barraclough p.28

This puts the problems of dating aside. The folding sovereign balance and the shelf-edge postal scales by John Greaves & Son were made of German silver, alloyed in Britain, shortly after its introduction.

N & Q 129 — from A Crawforth

I recently acquired, from a Scottish dealer, a set of British nesting weights, with an outer cup with a flat-topped lid weighing 4 oz Troy. The cup and the lid are made of dark brass/bronze, but the hinge and the clasp are made of yellow brass. There are no rings or turning marks on the inner surface of the lid. It is a very well-made, well-proportioned set, missing only the tiny centre. The inner base of each cup is stamped twice with the mark JB crowned. Is this a verification mark? Did any makers use a crown as part of their mark? Can any ISASC member help Andrew?